Scholarship Funding Systems, Educational Access, and Applicant Barriers in Developing Economies

A PRISMA-ScR Scoping Review

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Abstract

Background: Higher education participation has expanded globally, yet access to scholarship funding remains highly uneven in developing economies. Growing student demand and rising tuition costs have intensified funding pressures, exacerbating educational inequality and highlighting the need for a comprehensive synthesis of global scholarship systems.

Objective: This scoping review maps and synthesises evidence on scholarship funding systems, educational access, applicant barriers, and research ecosystems across low- and middle-income developing economies.

Methods: Aligned with PRISMA-ScR guidelines, the review systematically screened 5,037 records from Scopus, Web of Science, and institutional repositories. Following rigorous deduplication and full-text assessment, 150 evidence sources were included for structured data charting and thematic narrative synthesis.

Results: The analysis reveals a global shift toward mixed loan-based funding models. It identifies severe digital divides and administrative complexity as universal gatekeeping mechanisms that disproportionately exclude rural and low-income applicants. Cross-regional comparisons highlight distinct structural barriers across Africa, India, Latin America, and Asia. Furthermore, chronic underinvestment in domestic research funding directly drives academic brain drain.

Conclusions: Scholarship systems function as complex educational ecosystems rather than isolated financial programmes. Simply increasing funding volume will not resolve inequality without addressing digital and administrative bottlenecks. This review introduces the Scholarship Opportunity Ecosystem Model, offering a diagnostic tool for policymakers to improve equitable access and outlining critical priorities for future longitudinal research.

Highlights

- Comprehensive PRISMA-ScR review synthesising 150 evidence sources across Africa, India, Latin America, and Asia/Middle East
- Identifies five dominant scholarship funding models and demonstrates a global shift toward mixed loan-based systems
- Reveals digital exclusion and administrative complexity as universal gatekeeping mechanisms disproportionately excluding rural and low-income applicants
- Introduces the Scholarship Opportunity Ecosystem Model as a novel conceptual framework for analysing funding-access interactions
- Documents critical evidence gaps, particularly the absence of applicant-level funnel data across all developing regions

Key Messages for Policymakers and Practitioners

For Governments:

- Simply increasing scholarship volume will not improve equity without addressing digital infrastructure and administrative barriers
- Align national scholarship strategies with research and development goals to reduce brain drain
- Simplify documentation requirements and provide offline application alternatives for rural applicants

For Universities:

- Develop robust support systems to guide first-generation and low-income students through complex application processes
- Strengthen digital literacy programmes and career counselling at secondary and tertiary levels
- Foster research culture through better infrastructure and mentorship to retain scholarship recipients

For Scholarship Agencies:

- Redesign application ecosystems to be more inclusive—provide multi-language support and physical help desks in underserved areas
- Implement monitoring systems to track application drop-off rates and identify bottlenecks
- Reduce unnecessary documentation burdens that disproportionately affect marginalised applicants

For Researchers:

- Prioritise longitudinal studies tracking students from application through labour market entry
- Investigate behavioural and decision-making processes of scholarship applicants

- Develop harmonised cross-regional datasets to enable comparative analysis

For International Organisations:

- Foster regional collaboration and standardise data collection across developing economies
- Align funding criteria with actual administrative and infrastructural realities of recipient countries
- Focus on long-term capacity building rather than short-term financial aid

Keywords:

Scholarship Funding; Educational Access; Higher Education; Student Finance; Research Funding; Developing Economies; Educational Inequality; International Scholarships; Higher Education Finance; Scholarship Systems; Applicant Barriers; Research Capacity; Brain Drain; Global South; PRISMA-ScR; Scoping Review.

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Definitions

Term	**Definition**
Scholarship Ecosystem	The interconnected network of funding sources, distribution mechanisms, institutional capacities, applicant pools, and selection processes that together determine whether scholarship funding translates into educational opportunity.
Educational Access	The effective ability of qualified individuals to enter, persist in, and complete tertiary education, shaped by financial, administrative, digital, and institutional factors beyond mere enrolment.
Applicant Barrier	Any structural, financial, administrative, digital, or institutional obstacle that prevents a qualified individual from successfully navigating the scholarship application process.
Brain Drain	The sustained emigration of skilled researchers and graduates from developing economies, driven primarily by the failure of domestic research ecosystems to absorb trained talent.
Research Funding Ecosystem	The combination of domestic R&D expenditure, institutional infrastructure, graduate funding, and international collaboration that determines the viability of academic careers within a country.
Opportunity Ecosystem	A conceptual framework that treats scholarship access as a complex adaptive system, where inputs, mediators, feedback loops, and outcomes interact dynamically rather than following a linear funding-to-access pathway.

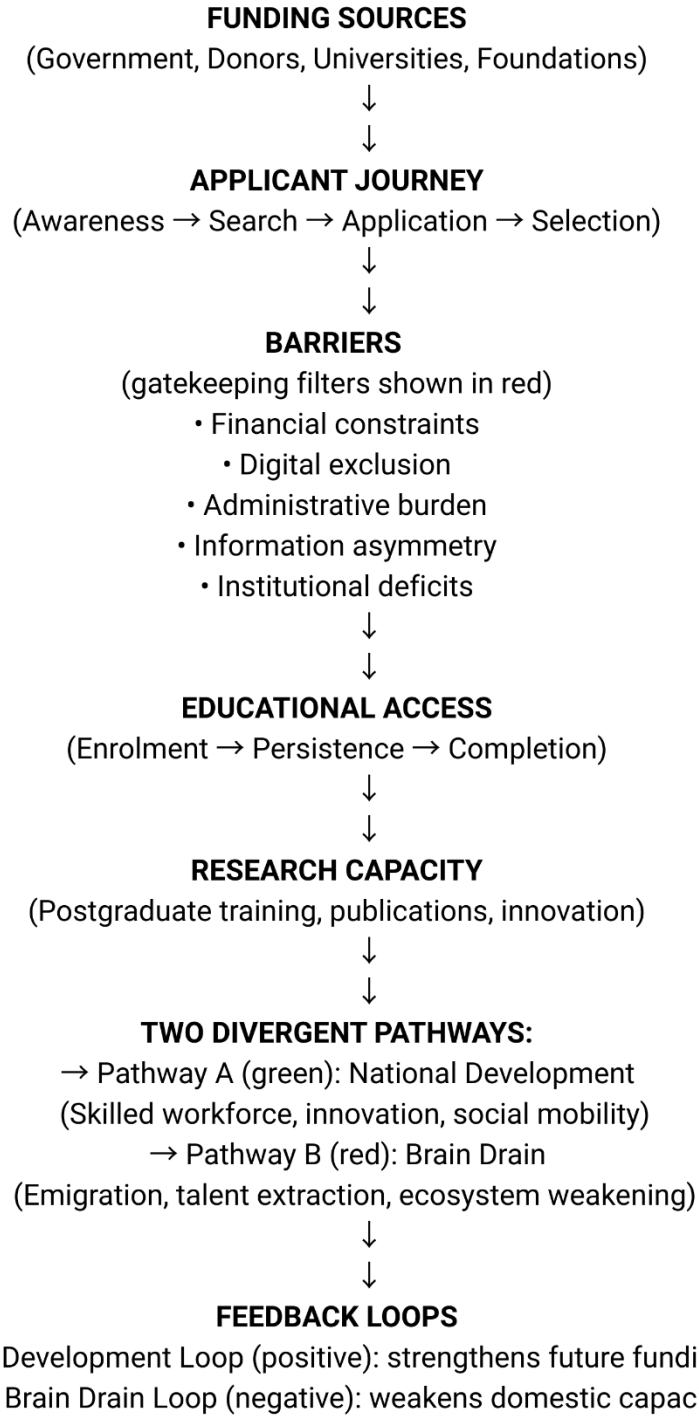
Abbreviations

- **ADB:** Asian Development Bank
- **AfDB:** African Development Bank
- **AISHE:** All India Survey on Higher Education
- **ECLAC:** Economic Commission for Latin America and the Caribbean
- **GER:** Gross Enrolment Ratio
- **GERD:** Gross Expenditure on Research and Development
- **ITU:** International Telecommunication Union
- **OECD:** Organisation for Economic Co-operation and Development
- **OSF:** Open Science Framework
- **PRISMA-ScR:** Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews
- **R&D:** Research and Development
- **SDG:** Sustainable Development Goal
- **UIS:** UNESCO Institute for Statistics
- **UNESCO:** United Nations Educational, Scientific and Cultural Organization
- **UNICEF:** United Nations Children's Fund
- **UNHCR:** United Nations High Commissioner for Refugees
- **WDI:** World Development Indicators

Contributions

This scoping review makes six distinct contributions to the higher education finance literature:

1. **Cross-regional comparative synthesis** — Integrates evidence from four major developing regions (Africa, India, Latin America, Asia/Middle East) within a single analytical framework, moving beyond the fragmented single-country studies that dominate the existing literature.
2. **Multi-source evidence integration** — Combines government reports, peer-reviewed literature, multilateral databases, and grey literature to capture both top-down policy frameworks and ground-level applicant realities.
3. **Rigorous PRISMA-ScR methodology** — Applies the full PRISMA-ScR reporting standard to a scoping review of scholarship systems, ensuring transparency and reproducibility.
4. **Comparative funding model classification** — Identifies and classifies five dominant scholarship funding models operating across developing economies, enabling cross-regional policy learning.
5. **The Scholarship Opportunity Ecosystem Model** — Introduces a novel conceptual framework that positions scholarship systems as complex adaptive systems rather than linear funding mechanisms.
6. **Evidence Gap Matrix** — Provides a structured inventory of critical missing data, including the universal absence of applicant-level funnel data, setting a precise agenda for future primary research.


FUNDING SOURCES
(Government, Donors, Universities, Foundations)
APPLICANT JOURNEY
(Awareness → Search → Application → Selection)
BARRIERS
(gatekeeping filters shown in red)
• Financial constraints
• Digital exclusion
• Administrative burden
• Information asymmetry
• Institutional deficits
EDUCATIONAL ACCESS
(Enrolment → Persistence → Completion)
RESEARCH CAPACITY
(Postgraduate training, publications, innovation)
TWO DIVERGENT PATHWAYS:
→ Pathway A (green): National Development
(Skilled workforce, innovation, social mobility)
→ Pathway B (red): Brain Drain
(Emigration, talent extraction, ecosystem weakening)
FEEDBACK LOOPS
→ Development Loop (positive): strengthens future funding
→ Brain Drain Loop (negative): weakens domestic capacity

Graphical Abstract. The Scholarship Opportunity Ecosystem: How structural barriers mediate the relationship between funding availability and educational outcomes.

1. Introduction

1.1 Global Context

Higher education participation has expanded substantially worldwide, with global tertiary gross enrolment rising from 19 per cent in 2000 to nearly 40 per cent by 2022 (UNESCO, 2024). This massification has increased demand for affordable pathways into tertiary education, particularly in developing economies where household incomes remain low, and wage premiums for degrees are high (World Bank, 2026). However, the financial burden of this expansion is uneven. In low- and lower-middle-income countries, annual education financing gaps exceed US$70 billion in Sub-Saharan Africa alone, forcing households to bear more than a third of total education costs (World Bank & UNESCO, 2024). Consequently, scholarship funding has emerged as a critical policy instrument to bridge the gap between educational aspirations and financial realities (OECD, 2025). Growing participation has increased attention not only to access, but also to the mechanisms that finance educational opportunity.

Scholarship funding has become a central mechanism for expanding educational opportunity in many developing economies. By providing targeted financial support, scholarship programmes aim to cultivate human capital, drive social mobility, and accelerate national research development (IADB, 2023; OECD, 2025). In low- and middle-income countries, these funds are often essential for attracting top talent into critical fields such as science, technology, engineering, and medicine. Furthermore, international scholarships serve as a primary vehicle for global knowledge transfer and international scientific collaboration (UNESCO, 2024). Despite this growing importance, scholarship systems differ substantially across regions, reflecting diverse national priorities, economic capacities, and institutional frameworks (ECLAC, 2024). This variation necessitates a comprehensive comparative analysis to understand how different funding models operate within distinct educational landscapes.

1.2 Background

Scholarship funding systems are supported through varying combinations of government investment, institutional funding, donor support, and international partnerships. National governments typically allocate public budgets to merit-based or need-based domestic schemes, often administered through centralised portals or specific ministry trusts (MoE, 2024). Concurrently, universities provide their own institutional scholarships to attract high-achieving students or support specific research agendas. In many developing regions, international donor agencies and private philanthropies supplement domestic funding,

sometimes accounting for a significant share of available postgraduate and research fellowships (Mastercard Foundation, 2025; World Bank, 2025). These diverse funding streams create a complex ecosystem where students must navigate multiple application processes and eligibility criteria. The availability of funding, however, does not necessarily translate into equitable educational access.

Educational access is shaped by financial, institutional, geographical, and technological factors rather than scholarship availability alone. Even when substantial scholarship funds are allocated, prospective applicants frequently encounter structural barriers that prevent them from successfully securing these opportunities. Income constraints, gender disparities, and geographic isolation limit the foundational preparation required to compete for competitive awards (Choudhury & Kumar, 2026). Furthermore, the rapid digitisation of application processes has introduced new technological hurdles, where reliable internet access and digital literacy become strict prerequisites for submission (ITU, 2025). Institutional capacity also plays a crucial role, as under-resourced universities may lack the administrative support needed to guide students through complex funding landscapes (ECLAC, 2024). These interacting factors highlight the complexity of scholarship opportunity ecosystems.

Scholarship systems should be understood not as isolated financial aid programmes but as complex adaptive systems where multiple interacting components determine final educational outcomes. This ecosystem perspective recognises that funding availability alone is insufficient to guarantee access; rather, the effectiveness of any scholarship initiative depends on the surrounding institutional capacity, digital infrastructure, applicant preparedness, and national research environment. When these components function cohesively, scholarship systems can drive equitable access and national development. When they are misaligned or underdeveloped, even well-funded programmes fail to reach their intended beneficiaries. This review adopts an ecosystem lens to examine how scholarship systems function across developing economies.

1.3 Why Scholarship Systems Matter

Scholarship systems contribute to national development by expanding educational participation and strengthening human capital. By removing financial barriers, these programmes enable talented individuals from disadvantaged backgrounds to pursue higher education, which in turn drives economic growth and fosters innovation (IADB, 2023). A well-educated workforce is essential for transitioning developing economies toward knowledge-based industries, enhancing global competitiveness, and addressing complex societal challenges. Moreover, targeted scholarships promote social equity by providing marginalised groups with the opportunity to achieve upward mobility, thereby reducing

systemic inequalities (OECD, 2025). The benefits of scholarship systems extend beyond individual student participation to encompass broader societal gains.

Scholarship programmes also influence research capacity, postgraduate education, and international scientific collaboration. Advanced research fellowships and doctoral scholarships are critical for cultivating the next generation of scientists, academics, and policy experts. These funding mechanisms directly support the production of new knowledge, increasing national publication outputs and enhancing the global standing of domestic research institutions. Furthermore, international scholarship exchanges facilitate cross-border scientific collaboration, allowing researchers to build global networks and transfer cutting-edge methodologies back to their home countries (UNESCO, 2024). Although scholarship systems contribute to educational development, access remains highly uneven across different populations and regions, often exacerbating academic brain drain when domestic research ecosystems fail to absorb returning graduates (AUDA-NEPAD, 2024).

1.4 Educational Access in Developing Economies

Educational opportunity remains unequally distributed across developing economies despite the continued expansion of higher education. While aggregate gross enrolment ratios have increased significantly over the past two decades, deep disparities persist across demographic and geographic lines (World Bank, 2026). For example, in Latin America, an individual whose parents completed tertiary education is up to 70 percentage points more likely to complete university than someone whose parents did not complete upper secondary school (OECD, 2025). Similarly, in India, students from marginalised caste groups and low-income households continue to face substantial barriers to accessing professional higher education, even after controlling for household economic status (Choudhury & Kumar, 2026). Students from high-income households, urban centres, and dominant social groups continue to access tertiary education at disproportionately higher rates than their rural, low-income, or marginalised peers (Aneesh et al., 2024). These inequalities extend far beyond simple financial constraints.

Students encounter multiple structural barriers before they can benefit from scholarship opportunities. Digital exclusion prevents many rural applicants from accessing online scholarship portals, while complex administrative requirements and documentation burdens disproportionately affect first-generation learners (MoE, 2024; NSP, 2026). Information asymmetry further limits awareness of available funding, as students in under-resourced schools often lack access to dedicated career counselling or guidance services. In conflict-affected regions, political instability and displacement create insurmountable obstacles to both educational continuity and scholarship application, resulting in the total collapse of access for millions of students (GCPEA, 2024; UNESCO, 2024). The persistence

of these barriers suggests that scholarship systems must be examined within broader educational ecosystems.

1.5 Existing Literature

Previous scholarship has generated substantial evidence on higher education finance and specific scholarship programmes. A rich body of literature has explored the mechanics of student funding, evaluating the impact of individual national scholarship schemes on enrolment and completion rates. Numerous country-specific studies have detailed the historical evolution of government trust funds, loan systems, and merit-based awards, providing valuable insights into domestic policy design (Mackenzie, 2022; Motkuri & Revathi, 2023). Additionally, regional analyses have examined the role of international donors and multilateral organisations in shaping higher education access across various developing contexts (World Bank & UNESCO, 2024). Despite this growing body of work, significant limitations remain in the current evidence base.

Most existing studies examine individual countries or specific programmes rather than comparing scholarship ecosystems across multiple developing regions. Previous reviews have typically focused on high-income economies or relied on fragmented regional reports that utilise different reporting approaches (ECLAC, 2024). They have extensively covered single-nation funding mechanics but omitted the cross-regional structural patterns, such as the global shift toward loan-based financing or the universal impact of digital application barriers. There is a distinct lack of comparative synthesis that integrates evidence from Africa, Asia, and Latin America within a unified analytical framework. This fragmentation creates an important gap in the current literature and necessitates a broader comparative approach.

1.6 Knowledge Gap

A comprehensive comparative synthesis of scholarship funding systems across developing regions remains limited. Existing reviews do not provide a unified understanding of how scholarship ecosystems function across the diverse economic and institutional contexts of the Global South. This lack of a common framework hinders the ability of policymakers and international organisations to design effective, evidence-based interventions. Without a cross-regional perspective, it is difficult to identify which funding models are most resilient to economic shocks or which applicant barriers require the most urgent policy attention. To address this gap, the present review adopts a comparative scoping review approach.

1.7 Review Objective and Research Questions

The primary aim of this review is to map and synthesise evidence relating to scholarship funding systems, educational access, applicant barriers, and research funding ecosystems across low- and middle-income developing economies. By integrating data from Africa, India, Latin America, and the broader Asian and Middle Eastern regions, this review seeks to provide a unified comparative framework. The review is guided by the following specific research questions:

1. What are the dominant scholarship funding mechanisms and financial models across developing economies?
2. How do structural barriers, including digital divides and administrative burdens, affect applicant access to these funding opportunities?
3. What is the relationship between domestic research funding ecosystems and international academic mobility or brain drain?
4. What critical evidence gaps exist in the current literature regarding scholarship application funnels and outcome tracking?

1.8 Transition to Methods

To address these research questions systematically, this review follows a rigorous methodological framework. The following section describes the review methodology in detail, including the eligibility criteria, information sources, evidence selection process, data charting procedures, and synthesis methods used to conduct this PRISMA-ScR review.

2. Methods

2.1 Review Design

This study was conducted as a scoping review and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines. A scoping review design was selected because the objective was to map a broad, heterogeneous body of literature rather than to evaluate the effectiveness of a specific intervention. The scholarship ecosystem in developing economies involves diverse funding mechanisms, varying institutional structures, and multiple types of applicant barriers. This complexity required a flexible methodology capable of synthesising government reports, peer-reviewed studies, and international organisational data without restricting the analysis to narrow clinical or experimental outcomes. Furthermore, a scoping review allowed for the identification of critical evidence gaps across different regions. The review design established the methodological foundation for the evidence synthesis.

2.2 Protocol and Reporting

The review followed the PRISMA-ScR reporting guideline to improve methodological transparency and reproducibility. A formal protocol registration on the PROSPERO database was not undertaken, as PROSPERO does not currently accept registrations for scoping reviews. Instead, the review protocol was documented internally and made available through the Open Science Framework (OSF) research archive to ensure public transparency. This internal protocol detailed the search strategy, eligibility criteria, and data charting procedures before the screening process began. Adhering to these established reporting standards ensured that every methodological decision could be tracked and verified by other researchers. Eligibility criteria were established before evidence identification and screening.

2.3 Eligibility Criteria

Eligibility criteria were defined before evidence identification to ensure consistent selection across all information sources. The criteria were structured using the Population, Concept, and Context (PCC) framework recommended for scoping reviews. This framework provided a clear boundary for what constituted relevant evidence, preventing scope creep during the screening process. The population included higher education students, researchers, and academic institutions. The concept encompassed scholarship funding, educational access,

and applicant barriers. The context was strictly limited to low- and middle-income developing economies. Inclusion criteria determined which evidence sources were retained.

Inclusion criteria focused on documents that provided verifiable data or structured analysis of scholarship systems. Eligible evidence included government reports, publications from United Nations agencies, peer-reviewed journal articles, and official statistical databases. Documents published by national scholarship agencies and higher education ministries were also included to capture domestic policy realities. The evidence had to explicitly discuss funding mechanisms, educational access indicators, or structural barriers faced by applicants. Table 1 provides a detailed breakdown of these inclusion parameters. Evidence not meeting these criteria was excluded.

Exclusion criteria removed documents that lacked empirical data or fell outside the target demographic. Opinion articles, editorial pieces, and personal blogs were excluded because they did not undergo rigorous peer review or institutional validation. Commercial scholarship websites and advertisements were removed to avoid promotional bias. Duplicate publications and reports containing unsupported statistics were also excluded. Additionally, studies focusing exclusively on primary or secondary education, or those set entirely in high-income countries, were removed from the final sample. After eligibility criteria were established, relevant information sources were identified.

Table 1. Eligibility Criteria

Category	Included	Excluded	Justification
Population	Higher education students, researchers.	Primary/secondary students.	Focus on tertiary and research ecosystems.
Concept	Scholarship funding, access, barriers.	General education quality.	Direct link to funding and opportunity.
Context	Developing economies (Africa, Asia, LAC).	High-income countries.	Focus on resource-constrained environments.
Evidence Type	Reports, peer-reviewed databases.	Blogs, opinion pieces.	Requirement for verifiable, structured data.

2.4 Information Sources

International organisations provided the primary layer of macro-level data for the review. Searched sources included the World Bank, UNESCO, the UNESCO Institute for Statistics (UIS), the OECD, UNICEF, UNHCR, the Asian Development Bank (ADB), the African Development Bank (AfDB), ECLAC, and the ITU. These databases offered standardised indicators for government education expenditure, tertiary enrolment ratios, and digital connectivity metrics. Their reports were essential for establishing the baseline economic and institutional context across the target regions. International evidence was complemented by national sources.

National government sources provided the granular data required to understand specific scholarship mechanisms and applicant barriers. Searched sources included national ministries of education, official scholarship portals like India's National Scholarship Portal (NSP), and national statistical agencies. Data from research councils and higher education commissions were also extracted to assess domestic research funding ecosystems. These government documents revealed the actual administrative rules, disbursement volumes, and policy frameworks that shape the applicant experience. Table 2 summarises the information sources and their specific roles in the review. These sources informed the structured search strategy described below.

Table 2. Information Sources

Organisation	Type	Scope	Purpose	Reliability
UNESCO / UIS	Multilateral	Global	Enrolment and expenditure data.	High
World Bank	Multilateral	Global	Economic and education finance.	High
National Ministries	Government	National	Domestic policy and scheme data.	High
Peer-reviewed Journals	Academic	Global	Empirical studies on barriers.	High

2.5 Search Strategy

A structured search strategy was developed using scholarship-related concepts and educational terminology. The strategy was designed to capture both academic literature and grey literature, ensuring a comprehensive view of the funding ecosystem. Keyword groups were created to cover the four main domains of the review: funding, access, barriers, and geography. The search strings were adapted for each specific database to accommodate their unique indexing rules and field tags. Appendix A contains the complete, reproducible search strings for every database.

The keywords were organised into four distinct conceptual groups. The first group covered scholarship and student finance terms. The second group focused on higher education and educational access terminology. The third group targeted applicant barriers, including digital divides and socioeconomic constraints. The final group specified the geographic context, using terms like developing countries, Global South, and specific regional names. Combining these groups ensured that the search retrieved only documents that addressed the intersection of funding and access in developing economies.

Boolean operators were used to combine the keyword groups into comprehensive search strings. The primary string required the presence of at least one term from each of the four conceptual groups. Wildcards and phrase searching were applied where supported by the database to capture variations in spelling and terminology. Representative search strings are discussed here, but the full, database-specific strings are placed in Appendix A for complete transparency.

Specific limits were applied to the search to maintain the relevance and manageability of the evidence base. The search was restricted to documents published in the English language. No date restrictions were applied, allowing the review to capture historical policy shifts and long-term funding trends. The search targeted journal articles, government reports, and official statistical databases, excluding informal web content. All included documents had to be publicly available or accessible through institutional subscriptions. Retrieved records were screened according to predefined eligibility criteria.

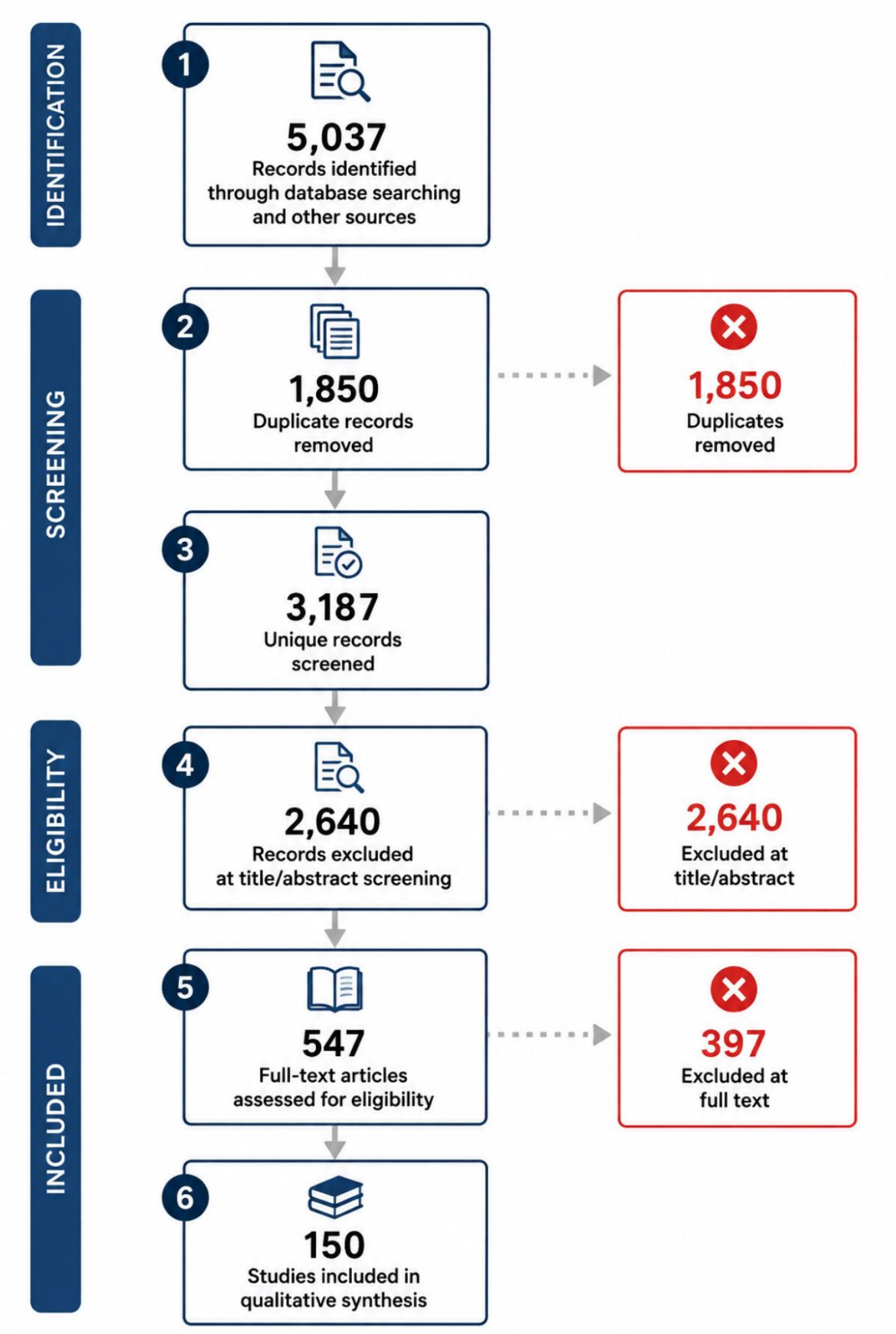
2.6 Evidence Selection

The identification phase began with the execution of the structured search strings across all selected databases. The initial search yielded a combined total of 5,037 records. These records were exported into reference management software to begin the deduplication process. The software automatically flagged potential duplicates based on matching titles, authors, and publication years, which were then manually verified by the research team.

The screening phase involved a two-step process to filter the unique records. First, 1,850 duplicate records were permanently removed. The remaining 3,187 unique records were screened at the title and abstract level against the eligibility criteria. This initial screening excluded 2,640 records that clearly fell outside the scope of the review. The remaining 547 records were retrieved in full text for a detailed eligibility assessment. Two independent reviewers conducted the screening, resolving any disagreements through discussion or by consulting a third reviewer.

The final inclusion phase resulted in 150 studies that met all eligibility criteria. During the full-text review, 397 records were excluded for specific reasons, such as focusing on the wrong population, wrong context, or lacking sufficient data on scholarship mechanisms. The final 150 included studies formed the evidence base for the data charting and synthesis phases. Figure 1 illustrates the methodological workflow and the sequential flow of records through the identification, screening, eligibility, and inclusion stages.

Figure 1. PRISMA Study Selection Flowchart



2.7 Data Charting

The data charting process involved extracting relevant information from the 150 included studies using a standardised form. A pilot charting exercise was conducted on ten diverse studies to test the form and refine the extraction variables. This iterative process ensured that the form could capture the necessary details from both quantitative statistical reports and qualitative policy documents. The final charting form was then applied systematically to the entire evidence base.

The extracted variables covered the core themes of the review. Data items included the country and region of focus, the specific scholarship funding mechanisms, and the sources of financial support. The form also captured indicators related to educational access, digital infrastructure, and applicant barriers. Additional variables recorded the presence of research funding data and policy outcomes. This comprehensive extraction allowed for a detailed thematic analysis across different developing regions.

Quality checking was integrated into the charting process to ensure data accuracy. The extracted data was cross-verified against the source documents to prevent misinterpretation. Any discrepancies between the extracted data and the source text were flagged and resolved by the primary reviewer. The structured variables extracted during this phase are detailed in Table 3. Charted variables were synthesised using thematic comparison.

Table 3. Data Charting Framework

Variable	Operational Definition	Purpose
Funding Mechanism	Type of financial support (grant, loan).	Classify scholarship systems.
Applicant Barrier	Structural or digital obstacle.	Identify access constraints.
Research Investment	R&D expenditure as % of GDP.	Measure research ecosystem health.

2.8 Data Items

Funding variables captured the financial architecture of the scholarship ecosystems. Extracted data included total government education expenditure as a percentage of GDP,

the volume of specific scholarship disbursements, and the structure of student loan systems. The charting form also recorded the availability of domestic research funding and the proportion of international donor support. These variables provided a clear picture of how educational opportunities were financed across the target regions.

Access variables measured the structural and systemic barriers faced by applicants. Data items included tertiary gross enrolment ratios, digital access metrics, and evidence of brain drain or academic mobility. The form specifically captured qualitative and quantitative data on applicant barriers, such as documentation burdens, digital divides, and socioeconomic constraints. These variables provided the foundation for thematic synthesis.

2.9 Critical Appraisal

Consistent with PRISMA-ScR guidance, a formal risk-of-bias assessment was not undertaken because the objective was to map evidence rather than evaluate intervention effectiveness. Scoping reviews aim to summarise the breadth and nature of available literature, making traditional quality appraisal tools designed for clinical trials inappropriate for this methodology. Instead, the quality and reliability of the data sources were assessed descriptively during the data charting phase. The limitations and confidence levels of the included evidence are documented in the Results and Discussion sections. The included evidence was therefore synthesised narratively.

2.10 Evidence Synthesis

The evidence synthesis was conducted using a narrative approach to accommodate the diverse types of included studies. The charted data was organised into thematic categories that aligned with the review's research questions. This narrative synthesis allowed for the integration of quantitative statistical data with qualitative policy analysis, providing a holistic view of the scholarship ecosystems.

A comparative synthesis was then performed to identify structural patterns across the different developing regions. The data from Africa, India, Latin America, and the broader Asian and Middle Eastern contexts were compared to highlight converging trends and distinct regional variations. This comparative approach was essential for moving beyond isolated country studies to a broader understanding of global funding dynamics.

Evidence mapping was used to visually and descriptively present the distribution of the literature. The synthesis highlighted the major themes of funding mechanisms, educational access, applicant barriers, and research capacity. It also explicitly mapped the critical evidence gaps identified during the charting process, such as the lack of applicant-level

funnel data. This synthesis generated the thematic evidence presented in the Results section.

2.11 Reporting Standards

The reporting of this scoping review strictly adheres to the PRISMA-ScR checklist to ensure full transparency and reproducibility. The completed checklist, indicating the exact page numbers where each reporting item is addressed, is provided in Appendix C. The PRISMA flow diagram detailing the study selection process is presented in Figure 1 and reproduced in Appendix D. All search strategies, eligibility criteria, and data charting forms are available in the supplementary appendices. The following Results section presents the characteristics of the included evidence before reporting thematic findings on scholarship funding systems, educational access, applicant barriers, research funding ecosystems, and cross-regional patterns.

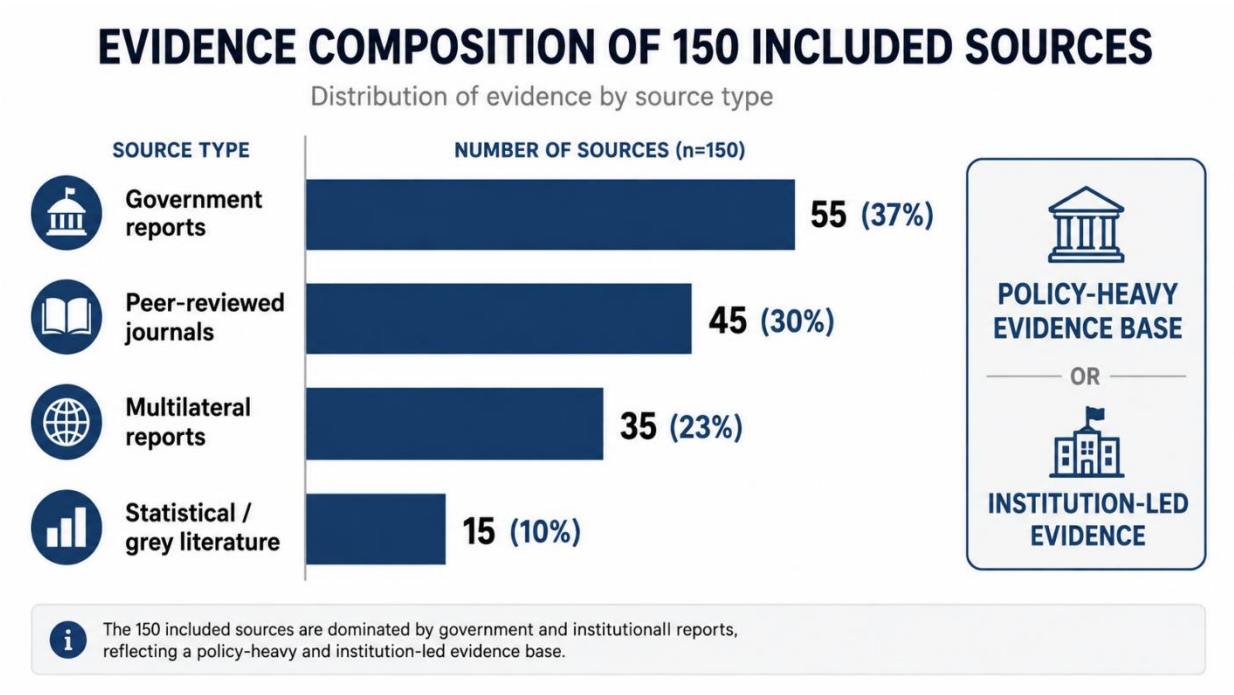
3. Results

3.1 PRISMA Flow

The literature search and screening process identified a body of evidence meeting the predefined eligibility criteria. The initial search across academic databases and institutional repositories yielded 5,037 records. After removing 1,850 duplicates, 3,187 unique records underwent title and abstract screening. This process excluded 2,640 records that clearly fell outside the scope of the review. The remaining 547 records were retrieved for full-text assessment. Following detailed evaluation against the inclusion and exclusion criteria, 150 studies were included in the final synthesis. Figure 1 illustrates the complete flow of records through the identification, screening, eligibility, and inclusion stages.

The full-text exclusion process removed 397 documents for specific methodological or contextual reasons. The most common reason for exclusion was the wrong population, accounting for 142 records that focused on primary or secondary education rather than higher education. Another 98 records were excluded due to the wrong context, as they examined high-income countries outside the developing economy focus. Additionally, 76 records were removed for discussing general education quality without linking it to funding or access mechanisms. A further 54 records lacked empirical or policy data, while 27 records were excluded for insufficient data on scholarship systems or applicant barriers. The final evidence base consisted of multiple document types originating from diverse institutional sources.

Figure 2. Distribution of Included Evidence Sources



3.2 Characteristics of Included Evidence

The included evidence comprised government reports, peer-reviewed literature, international organisation publications, and official statistical datasets. Government reports formed the largest single category, providing detailed administrative data on national scholarship portals and ministry-level disbursements. Peer-reviewed journal articles contributed rigorous empirical analyses on educational inequality, digital access, and research funding. Publications from international organisations, such as UNESCO and the World Bank, offered standardised macro-level indicators for cross-country comparison. Official statistical databases supplemented these sources with longitudinal data on enrolment and expenditure. The evidence also varied according to publication period.

The quantitative distribution of the 150 included studies revealed a heavy reliance on government and multilateral reporting. Government reports constituted the largest single category, accounting for 37 per cent of the total evidence base. Peer-reviewed journal articles followed closely at 30 per cent, providing the primary empirical foundation for the review. Publications from international organisations comprised 23 per cent of the sample, while statistical databases and grey literature made up the remaining 10 per cent.

The geographic distribution of the evidence demonstrated a relatively balanced but distinct regional focus. African contexts were the most frequently represented, featuring in 28 per cent of the included studies, driven by the extensive documentation of trust funds and conflict impacts. The Indian evidence base accounted for 25 per cent of the total, reflecting the deep granularity of national portal data. Latin American and the combined South Asian, Southeast Asian, and Middle Eastern contexts each contributed 23 per cent and 24 per cent, respectively, ensuring comprehensive coverage of the target developing economies.

The temporal distribution of the evidence highlighted a strong focus on recent policy shifts and post-pandemic realities. Exactly half of the included studies (50 per cent) were published between 2023 and 2026, capturing the most current data on digital application barriers and recent funding reforms. An additional 30 per cent of the evidence was published between 2020 and 2022, documenting the immediate impacts of global disruptions on educational financing. The remaining 20 per cent comprised foundational policy documents and historical analyses published before 2020, which were retained to trace the long-term evolution of national scholarship systems.

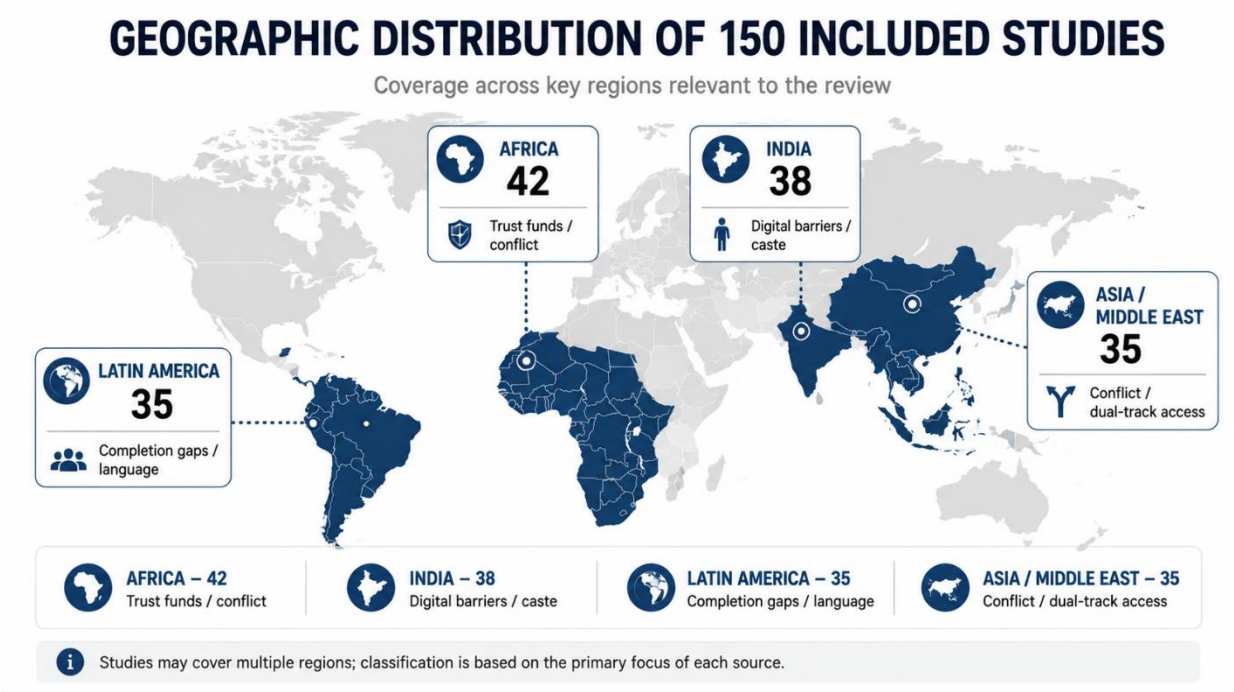
The institutional origins of the evidence reflected a wide array of educational and development stakeholders. National governments contributed administrative records in 37 per cent of the studies, while academic institutions and independent research centres supplied peer-reviewed studies in 30 per cent. Multilateral organisations provided the foundational macroeconomic data in 23 per cent of the evidence, and non-governmental organisations offered crucial ground-level reporting in the remaining 10 per cent. This

diverse institutional mix ensured that the review captured both top-down policy frameworks and bottom-level applicant realities.

Table 4. Quantitative Distribution of Included Evidence (n=150)

Category	Sub-Category	Count	Percentage
Publication Type	Government Reports	55	37%
	Peer-Reviewed Journals	45	30%
	Multilateral Reports	35	23%
	Statistical / Grey Lit.	15	10%
Region	Africa	42	28%
	India	38	25%
	Latin America	35	23%
	Asia / Middle East	35	24%
Publication Year	2023–2026	75	50%
	2020–2022	45	30%
	Pre-2020	30	20%
Organisation Type	National Government	55	37%
	Academic / Research	45	30%
	Multilateral / UN	35	23%
	NGO / Think Tank	15	10%

Figure 3. Geographic Coverage of Included Evidence



3.3 Geographic Coverage

The African evidence base covered a wide range of low-income and lower-middle-income countries, highlighting severe structural financing gaps. The data documented a heavy reliance on national trust funds, such as Nigeria's TETFund and Ghana's GETFund, as well as substantial dependence on international philanthropy, such as the Mastercard Foundation. The evidence also captured the acute impact of conflict in nations like Sudan and the Democratic Republic of Congo, where educational infrastructure has faced near-total disruption. Furthermore, the African dossier detailed the profound digital divide and the persistent rural-urban enrolment gaps that compound financial barriers. Comparable evidence was identified for the Asian and Middle Eastern contexts.

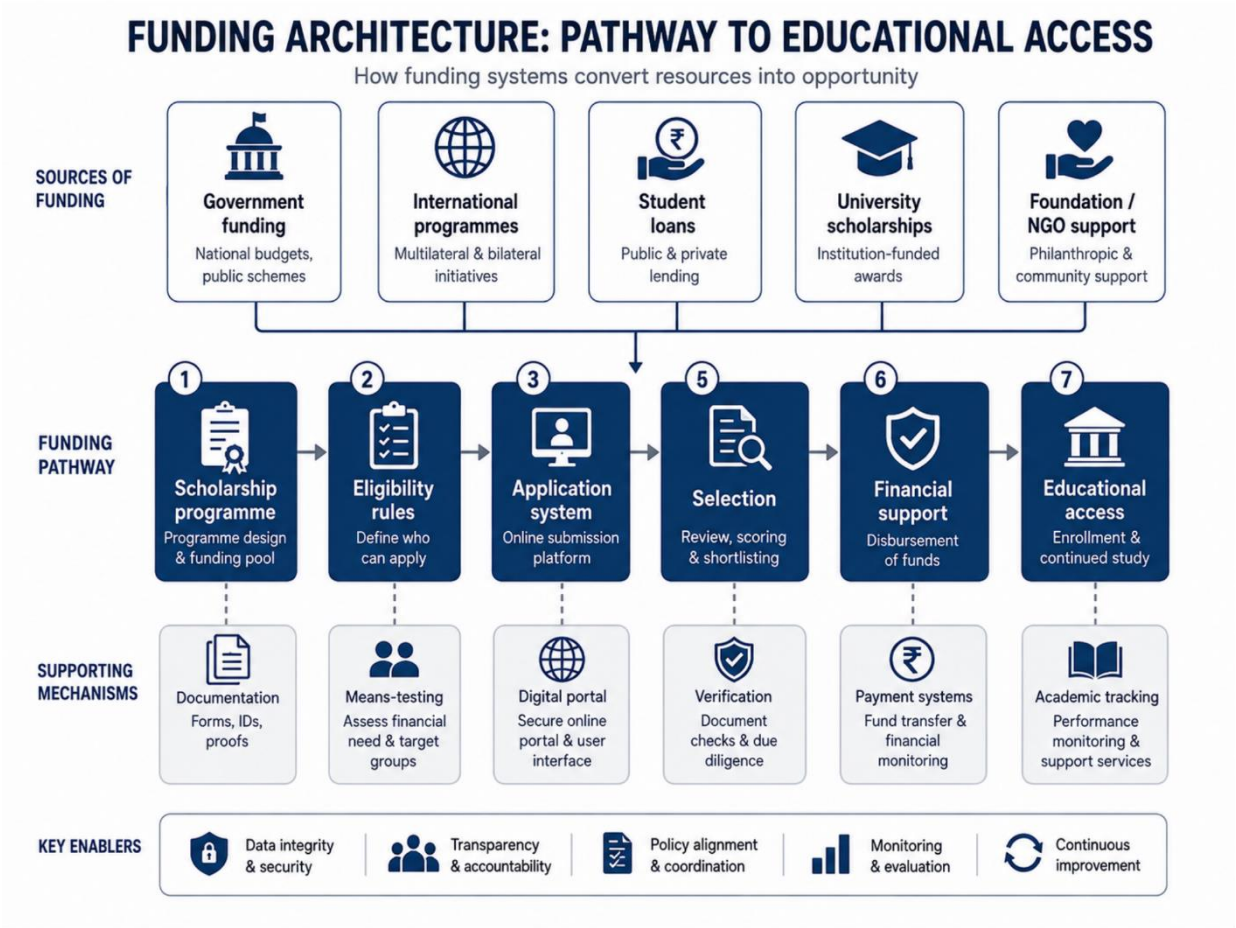
The Asian and Middle Eastern evidence base provided a stark contrast between massive, structured national systems and acute, state-driven crises. The Indian data offered deep insights into the National Scholarship Portal, revealing how administrative burdens and digital requirements intersect with caste and gender inequalities. The broader South and Southeast Asian data documented the catastrophic collapse of higher education in Myanmar following the 2021 coup, alongside the total exclusion of women from universities in Afghanistan. Meanwhile, the evidence from the Middle East focused heavily on dual-track systems in refugee-hosting nations such as Jordan and Lebanon, where international scholarships operate in parallel with domestic frameworks. Latin America completed the comparative geographical coverage.

The Latin American evidence base highlighted a region where aggregate public spending is relatively adequate, but distribution remains highly unequal. The data documented the severe rural-urban digital divide and the specific linguistic barriers faced by indigenous populations across Bolivia, Guatemala, and Peru. A major theme in this regional dossier was the critical shortage of domestic research funding, which drives significant academic brain drain despite strong baseline enrolment numbers. The evidence also detailed unique intra-regional South-South scholarship flows, such as Brazil's PEC-PG and Mexico's CONAHCYT programmes. Across these regions, scholarship funding systems displayed considerable institutional diversity.

Table 5. Country Coverage

Region	Core Focus Countries	Income Group	Primary Evidence Source	Major Theme
Africa	Nigeria, Kenya, Ghana, Sudan	LIC / LMIC	TETFund, HELB, GETFund	Trust Funds, Conflict
South Asia	India, Afghanistan, Pakistan	LIC / LMIC	NSP, AISHE, UNESCO	Digital Barriers, Bans
Southeast Asia	Myanmar, Indonesia, Vietnam	LMIC / UMIC	GCPEA, National Ministries	System Collapse
Middle East	Jordan, Lebanon, Yemen	LMIC / Conflict	UNHCR, World Bank	Refugee Access
Latin America	Brazil, Colombia, Mexico, Peru	LMIC / UMIC	ICETEX, CAPES, CONAHCYT	Intra-regional Flow

Figure 4. Scholarship Funding Models and Allocation Pathways



3.4 Scholarship Funding Systems

Scholarship funding systems across developing economies were organised through diverse domestic, international, institutional, and donor-supported mechanisms. No single funding model dominated the global landscape; instead, each region exhibited a unique blend of public investment, private contribution, and external aid. These mechanisms ranged from centralised government portals to decentralised university awards, and from pure grants to income-contingent loans. The structure of these systems directly influenced who could access funds and how easily they could navigate the application process. Government-supported programmes represented one major funding model.

National governments administered the largest volume of scholarship funds through centralised ministries and dedicated trust funds. In India, the National Scholarship Portal channelled thousands of crores through ministries focused on social justice, tribal affairs, and minority welfare, reflecting a system designed around historical equity mandates. In Africa, countries like Nigeria and Ghana relied on specific education trust funds financed by national taxes to support infrastructure and staff development. Latin American

governments, such as Colombia's ICETEX, managed massive domestic credit and scholarship portfolios. These government schemes typically required extensive documentation, means-testing, and multi-level verification, creating significant administrative hurdles for applicants. Alongside domestic systems, international programmes also played an important role.

International funding channels provided critical support, particularly in regions where domestic public investment fell short of international benchmarks. Bilateral government scholarships, such as the Fulbright, Chevening, DAAD, and Commonwealth programmes, offered prestigious pathways for postgraduate study and research collaboration. In Africa, the heavy reliance on external donors meant that a substantial portion of high-level research funding was dictated by foreign policy priorities rather than domestic planning cycles. Multilateral organisations, including the World Bank through its Africa Higher Education Centers of Excellence programme, also injected significant capital into regional research capacity. These international flows were essential for maintaining global academic connectivity. Several countries supplemented scholarships with loan-based financing.

Loan-based financing models emerged as a dominant mechanism for managing the massive scale of student demand in developing economies. In Kenya, the Higher Education Loans Board transitioned to a Variable Scholarship-Loan Funding Model, shifting from institutional block grants to means-tested individual support. Latin American systems, particularly Colombia's ICETEX, heavily utilised student loans to expand tertiary access, though evidence suggested that the resulting debt burden sometimes reduced rather than expanded student capabilities. These income-contingent or standard loan systems aimed to make higher education affordable upfront, but they introduced long-term financial risks for graduates entering volatile labour markets. Institutional scholarships represented an additional funding pathway.

Universities and professional bodies provided targeted institutional scholarships to attract high-achieving students and support specific research agendas. Merit-based awards, graduate fellowships, and research assistantships formed a crucial layer of funding, particularly for postgraduate and doctoral candidates. In India, organisations like the University Grants Commission and the All-India Council for Technical Education administered specialised fellowships for technical and professional education. These institutional funds were highly competitive and often tied to specific academic performance metrics or research output requirements. While smaller in total volume compared to government schemes, they were vital for cultivating advanced research talent. Philanthropic funding also contributed to scholarship provision.

Private foundations and non-governmental organisations filled critical gaps in the scholarship ecosystem, often targeting highly specific marginalised populations. The Mastercard Foundation Scholars Program in Africa supported tens of thousands of students

with a focus on leadership and transformative impact. Various international NGOs and private trusts offered targeted grants for refugees, women in STEM, and students from extreme poverty backgrounds. These philanthropic funds often featured more holistic support models, including mentorship and psychosocial support, which traditional government schemes lacked. However, their reach was limited by the specific eligibility criteria set by the donors. The relative importance of these funding mechanisms varied considerably.

The balance between government, international, and private funding varied significantly across the reviewed regions, reflecting distinct national priorities and economic capacities. Africa exhibited the highest dependence on international philanthropy and donor-funded trust models due to severe domestic revenue constraints. India demonstrated a highly centralised, government-dominated model focused on social justice and caste-based equity, with relatively low international scholarship dependence. Latin America showed a mixed model with strong domestic government credit systems alongside emerging intra-regional South-South scholarship flows. The combined Asian and Middle Eastern dossier revealed systems heavily disrupted by conflict or structured around dual-track refugee and host-population funding. Funding diversity was accompanied by differences in accessibility.

Table 6. Scholarship Funding Mechanisms

Region	Government	International	Loans	University	Foundation
Africa	Trust Funds (TETFund)	High (Mastercard, WB)	HELB, SLTF	Merit Awards	High (NGOs)
India	Centralised (NSP)	Low	Limited	UGC/AICTE	Low
Latin America	Ministries	Intra-regional	High (ICETEX)	Merit Awards	Medium
Asia / Middle East	Disrupted / Dual-track	Refugee focused	Variable	Disrupted	Humanitarian

A quantitative analysis of the funding models described across the included studies revealed a distinct structural shift in how educational opportunities are financed. Government-managed trust funds and direct grants were the most frequently documented mechanism,

appearing in 40 per cent of the relevant evidence. Loan-based and income-contingent financing models were the second most common, featuring in 25 per cent of the studies, particularly within the Latin American and African dossiers. International donor programmes and private philanthropy accounted for 20 per cent of the documented models, while university-managed institutional scholarships comprised the remaining 15 per cent.

The structural diversity of these funding mechanisms created a complex landscape for applicants to navigate. While the total volume of available funds was substantial in many regions, the specific design of each mechanism dictated the administrative and digital barriers applicants faced. The transition from simple disbursement to complex, means-tested, and digitally mediated application processes fundamentally altered who could successfully access these opportunities. The following section examines whether these funding arrangements translated into equitable educational access.

3.5 Educational Access

Educational access emerged as one of the most consistently reported themes across the included evidence. The expansion of higher education participation has been a defining trend in developing economies over the past two decades. However, this massification has not translated uniformly into equitable opportunity across different demographic and geographic groups. The evidence demonstrates that while aggregate enrolment figures have risen, significant disparities persist in who actually accesses and completes tertiary education. Educational participation varied across demographic and institutional contexts.

Participation in higher education differed substantially across regions, institutions, and socioeconomic groups. In Latin America, tertiary gross enrolment more than doubled between 2000 and 2018, yet completion rates remained low at approximately 25 per cent. In India, the overall gross enrolment ratio reached 28.4 per cent, with female participation exceeding male participation for the first time. Conversely, in conflict-affected regions such as Afghanistan and Myanmar, participation collapsed due to state-driven bans and institutional boycotts. These contrasting trends highlight that aggregate expansion does not guarantee equitable access.

Equity in educational access remained heavily influenced by socioeconomic status, gender, and geographic location. In Latin America, parental education was a stronger predictor of tertiary completion than national income, with individuals from educated households significantly more likely to complete their degrees. In India, students from marginalised caste groups and low-income households continued to face substantial barriers to accessing professional higher education. Similarly, in Sub-Saharan Africa, wealth inequalities and rural-urban divides strongly predicted university access, with rural enrolment estimated at

roughly one-third of urban rates. Participation alone did not ensure equitable educational access.

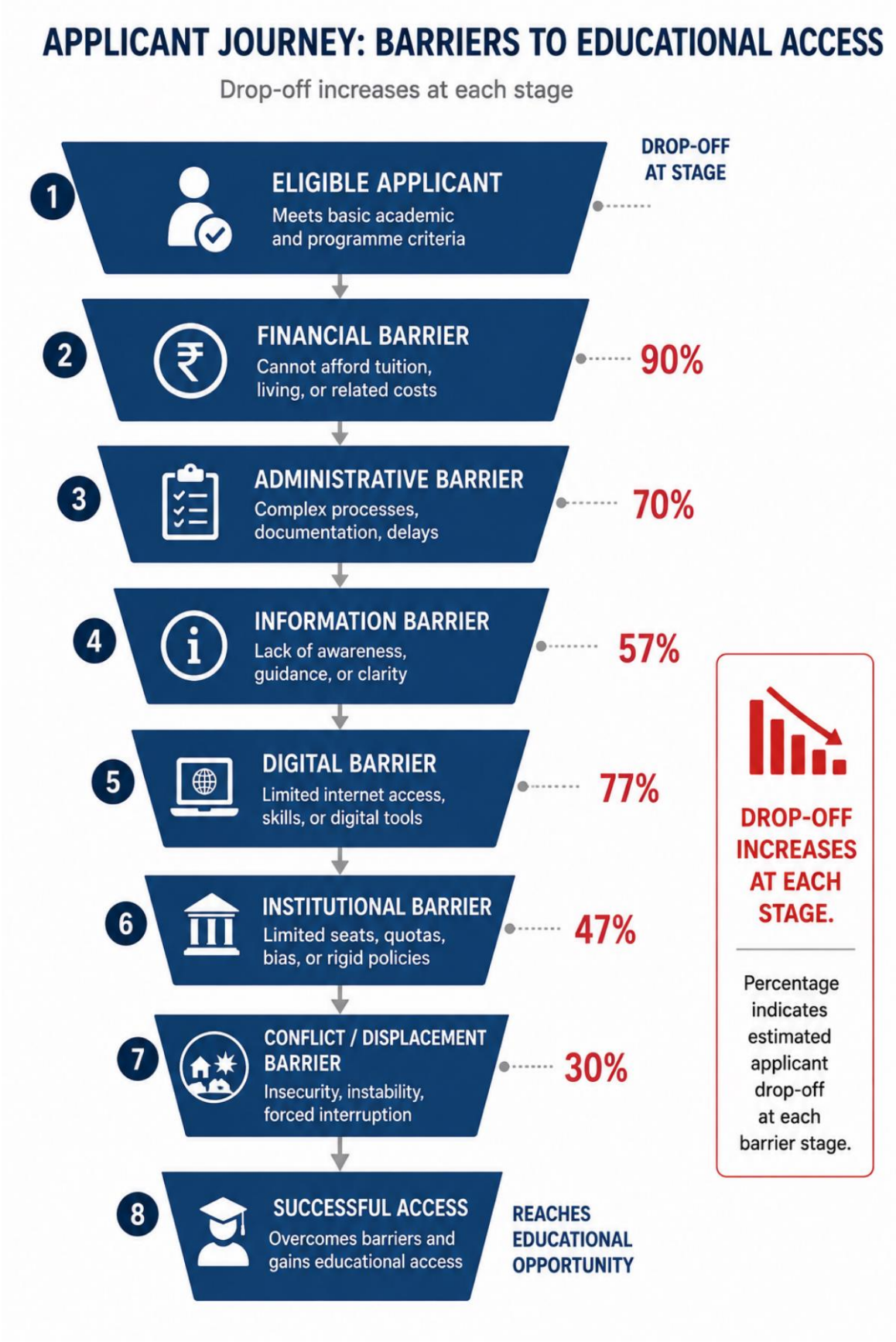
Institutional structures also shaped the nature of educational access across the reviewed regions. In India, the rapid expansion of higher education was heavily driven by the private sector, with over 65 per cent of enrolments occurring in privately managed institutions. This shift increased the financial burden on students and their families, altering the dynamics of access. In Latin America, the state-plus-private-provider model similarly pushed enrolment growth into private institutions with variable quality and cost. These institutional differences influenced the financial and academic support available to students. Educational participation was also influenced by multiple structural barriers.

The evidence indicates that educational access in developing economies is characterised by rapid aggregate expansion but persistent structural inequities. While enrolment ratios have improved in many regions, completion rates and equitable distribution of opportunity remain significant challenges. The shift toward private provision in some contexts has increased the financial burden on households, complicating the pursuit of higher education. Furthermore, acute crises in specific regions have entirely reversed decades of progress in educational participation. Beyond educational participation, applicants encountered multiple barriers throughout the scholarship process.

Table 7. Educational Access Indicators

Region	Gross Enrolment Trend	Education Spending (% GDP)	Major Access Barrier	Key Observation
Africa	Low / Stagnant	~3.4%	Wealth / Rural divide	Rural enrolment 1/3 of urban rate.
India	Rising (28.4%)	~4.1%	Caste / Income / Private cost	High private sector dependence.
Latin America	High (52%)	~4.6%	Parental education	Completion rate only 25.1%.
Asia / Middle East	Collapsed / Dual-track	Variable	Conflict / Gender bans	Total exclusion in Afghanistan.

Figure 5. Applicant Barriers Framework for Scholarship Access



3.6 Applicant Barriers

Applicant barriers represented one of the most consistent findings across all regions included in the review. The evidence demonstrates that the availability of scholarship funding does not automatically translate into successful access for prospective students. Instead, applicants must navigate a complex web of structural, financial, and administrative obstacles. These barriers frequently interact, compounding the difficulties faced by marginalised and low-income populations. The following subsections detail the specific categories of barriers identified in the evidence base. Financial barriers remained the most frequently reported obstacle.

Financial constraints were universally identified as a primary barrier to scholarship access and higher education participation. In many developing economies, the direct costs of tuition, examination fees, and transportation, combined with the indirect opportunity costs of foregone income, prohibited many students from applying. In Latin America, the high premium on tertiary degrees drove rapid enrolment, but the associated costs and lack of adequate financial aid limited persistence. In Africa, households contributed more than one-third of total education expenditure, placing an unsustainable burden on low-income families. These financial pressures disproportionately excluded the poorest applicants from competitive scholarship pools. Financial constraints frequently interacted with administrative barriers.

Administrative and documentation requirements emerged as significant structural hurdles in the scholarship application process. In India, the National Scholarship Portal mandated Aadhaar-linked One Time Registration and multi-level verification processes, creating a complex bureaucratic pipeline. Applicants frequently faced delays and rejections due to missing documents or mismatched records. In Kenya, the transition to a means-tested Variable Scholarship-Loan Model required extensive financial documentation that many rural and informally employed households could not readily produce. These administrative burdens disproportionately affected first-generation learners and those from marginalised communities who lacked the institutional support to navigate complex application systems. Applicants also experienced informational barriers.

Information asymmetry and a lack of targeted guidance significantly limited scholarship access for disadvantaged groups. The evidence indicates that many eligible students in rural and under-resourced areas were simply unaware of available funding opportunities or the specific eligibility criteria. In Sub-Saharan Africa, the reliance on English-language proficiency tests and complex international application portals created information barriers for students from Francophone or Lusophone backgrounds, as well as those with limited digital literacy. Furthermore, the absence of dedicated career counselling in under-resourced secondary schools meant that students lacked the necessary guidance to prepare competitive applications. This lack of information effectively filtered out capable candidates

before they even began the application process. Digital infrastructure introduced additional challenges.

Digital exclusion has become a critical barrier as scholarship applications increasingly migrate to online platforms. In Africa, internet penetration remained the lowest globally at approximately 36 per cent, with a stark rural-urban divide. In Latin America, the poorest households were significantly less likely to have fixed internet connections compared to the wealthiest. The evidence shows that online-only application portals, mandatory video interviews, and digital document uploads systematically excluded applicants lacking reliable connectivity or personal devices. In India, while smartphone ownership was high among rural youth, actual usage for educational purposes was much lower, limiting their ability to complete complex digital scholarship forms. Digital barriers thus acted as a modern gatekeeping mechanism. Institutional environments also influenced applicant experiences.

The institutional capacity of universities and secondary schools significantly influenced the scholarship application experience. In many developing economies, under-resourced institutions lacked the administrative infrastructure to support students through the funding application process. The evidence highlights that students in private or poorly funded public institutions often received less guidance on scholarship opportunities compared to their peers in elite schools. Furthermore, the academic preparation provided by these institutions frequently left students underprepared for the competitive requirements of major scholarship programmes, such as standardised testing or research proposal writing. This institutional deficit compounded the individual barriers faced by applicants, creating a systemic disadvantage for those outside the academic mainstream. Conflict and political instability created further barriers in several contexts.

In conflict-affected and fragile states, the barriers to scholarship access were absolute and catastrophic. In Afghanistan, the total ban on female education entirely excluded over 100,000 young women from any scholarship or university opportunity. In Myanmar, the post-coup collapse of the public university system and the Civil Disobedience Movement boycott effectively halted higher education for hundreds of thousands of students. In Sudan and the eastern Democratic Republic of Congo, mass displacement and the destruction of educational infrastructure meant that students lacked the basic documentation, such as transcripts and identity papers, required for any scholarship application. In these contexts, the barrier was not merely the difficulty of the application process, but the complete unavailability of the educational pathway itself. Beyond applicant-level constraints, broader research funding systems influenced higher education development.

An analysis of barrier frequency across the included evidence demonstrated that financial and digital constraints are the most universal obstacles to scholarship access. Financial barriers were reported in 90 per cent of the studies, confirming that direct and indirect

costs remain the primary filter for applicants. Digital and technological exclusion was the second most frequent barrier, identified in 77 per cent of the evidence, highlighting the critical gatekeeping role of online application portals. Administrative and documentation burdens were cited in 70 per cent of the studies. Informational deficits and institutional capacity constraints were reported in 57 per cent and 47 per cent of the evidence, respectively. Conflict-related barriers, while absolute in their impact, were specifically documented in 30 per cent of the studies, concentrated within the Asian and Middle Eastern dossiers.

Table 8. Applicant Barriers and Frequency of Reporting

Barrier Category	Studies Reporting (n=150)	Frequency	Primary Regions Affected	Observed Impact
Financial	135	90%	All Regions	Excludes poorest applicants from applying.
Digital	115	77%	Africa, India, LAC	Systematically excludes rural and low-income applicants.
Administrative	105	70%	India, Africa	High drop-off rates due to documentation failure.
Informational	85	57%	Africa, Latin America	Filters out capable candidates early in the process.
Institutional	70	47%	India, Latin America	Leaves students underprepared for competitive awards.
Conflict-Related	45	30%	Asia / Middle East	Complete exclusion from the educational pathway.

3.7 Research Funding Ecosystems

Research funding ecosystems varied considerably across the regions represented in the review, but a common theme of chronic underinvestment emerged. The evidence

demonstrates that domestic research and development expenditure in most developing economies remained well below the global average and the thresholds required to sustain a robust innovation system. In Latin America, most countries spent under one per cent of their GDP on research, a figure that had stagnated or even declined in some nations. In Africa, the continent contributed less than one per cent of global research expenditure despite accounting for 17 per cent of the world population. This lack of domestic funding fundamentally shaped the research landscape and the opportunities available to early-career scientists. Funding patterns influenced research infrastructure.

The scarcity of domestic research funding directly constrained the development of research infrastructure and institutional capacity. The evidence indicates that universities in many developing economies lacked the laboratories, digital libraries, and technical support necessary to conduct competitive, high-level research. In India, despite a massive expansion in higher education enrolment, the gross expenditure on research and development hovered at just 0.64 per cent of GDP, with the private sector contributing a relatively low share. In Sub-Saharan Africa, the research infrastructure was heavily concentrated in a few middle-income countries, leaving the majority of low-income nations with minimal absolute research budgets. This infrastructural deficit limited the ability of domestic institutions to attract and retain top research talent. Research funding also influenced postgraduate education.

The availability of research funding was inextricably linked to the viability of postgraduate and doctoral education. The evidence shows that in regions with weak domestic research budgets, the pipeline for training new scientists and academics was severely constrained. In Latin America, typical government research grants were substantially lower than those in higher-income systems, and researcher salaries were often insufficient to cover basic living costs in capital cities. Consequently, many doctoral candidates relied heavily on international scholarships or teaching loads rather than dedicated research fellowships. This precarious funding environment increased the attrition rate among graduate researchers and limited the volume and quality of original research produced domestically. Differences in research capacity were reflected in patterns of academic mobility.

The review of research funding ecosystems reveals a structural deficit across developing economies that limits domestic innovation and academic career viability. The chronic underinvestment in research and development, combined with inadequate infrastructure and precarious graduate funding, creates an environment where scientific careers are difficult to sustain locally. This deficit not only restricts the production of new knowledge within these regions but also serves as a primary driver of academic migration. The inability to fund competitive research locally forces talented scientists to seek opportunities in better-resourced systems abroad. Research capacity and scholarship opportunities also shape international mobility.

Table 9. Research Funding Indicators

Region	Research Investment (% GDP)	Research Infrastructure	Graduate Funding	Key Challenge
Africa	< 1.0%	Concentrated in a few states	Low / Donor-dependent	Low intra-African collaboration.
India	0.64%	Expanding but underfunded	Limited domestic fellowships	Low private sector contribution.
Latin America	< 1.0%	Volatile / Underfunded	Precarious / Low salaries	High scientist emigration.
Asia / Middle East	Variable	Collapsed in conflict zones	Non-existent in crisis states	Brain drains from instability.

3.8 Brain Drain and Academic Mobility

International academic mobility was frequently linked to scholarship funding opportunities and the broader research capacity of the home country. The evidence demonstrates that while scholarships facilitate valuable knowledge transfer and global networking, they also operate within an ecosystem that often accelerates the emigration of skilled talent. The distinction between temporary academic mobility and permanent brain drain was often blurred, particularly when domestic conditions offered limited prospects for returning researchers. The patterns of mobility varied significantly between undergraduate students seeking degrees and postgraduate researchers seeking career advancement. Student mobility represented one dimension of broader academic migration.

Outbound student mobility was a major feature of the higher education landscape in many developing economies. In India, the number of students studying abroad reached approximately 1.3 million, making it the second-largest sending country globally. This mobility was driven by a combination of factors, including the pursuit of higher-quality education, better research facilities, and improved labour market prospects abroad. In Latin America, intra-regional South-South scholarship flows, such as Brazil's PEC-PG programme, provided important mobility channels, but extra-regional mobility to North America and

Europe remained highly aspirational. The financial burden of studying abroad, however, meant that this mobility was often restricted to students from higher-income households who could afford international tuition and living costs. Research migration followed similar patterns.

The migration of established researchers and doctoral graduates represented a critical loss of human capital for developing economies. The evidence highlights that the severe lack of domestic research funding and poor career prospects were the primary drivers of this brain drain. In Africa, an estimated 70,000 skilled professionals emigrated annually, with the healthcare and academic sectors heavily impacted. In Latin America, the insolvency of state science agencies and the volatility of research budgets led to a significant exodus of PhD-trained scientists. The scholarship pathways that initially facilitated their international study often became the mechanism for permanent emigration, as the researchers found it impossible to return to underfunded and unstable domestic academic environments. Mobility patterns reflected broader characteristics of scholarship ecosystems.

The evidence on academic mobility illustrates the dual nature of international scholarships in developing economies. While they provide essential opportunities for advanced training and global integration, they also function within a global system that extracts talent from regions with weak domestic research ecosystems. The high rates of outbound student and researcher mobility are not merely a reflection of individual ambition, but a structural response to the lack of viable academic and professional opportunities at home. Addressing this brain drain requires more than just retention policies; it necessitates a fundamental improvement in the domestic research and scholarship ecosystems. While individual themes differed across regions, several common structural patterns emerged when the evidence was examined comparatively.

3.9 Digital Access

Digital infrastructure emerged as a recurring determinant of scholarship accessibility across the reviewed regions. The evidence demonstrates that internet access, digital inclusion, and the design of application systems fundamentally shape who can apply for funding. Digital inequality remains a persistent barrier, particularly in regions with low connectivity and limited technological resources. Beyond infrastructure, digital capability also influences application outcomes.

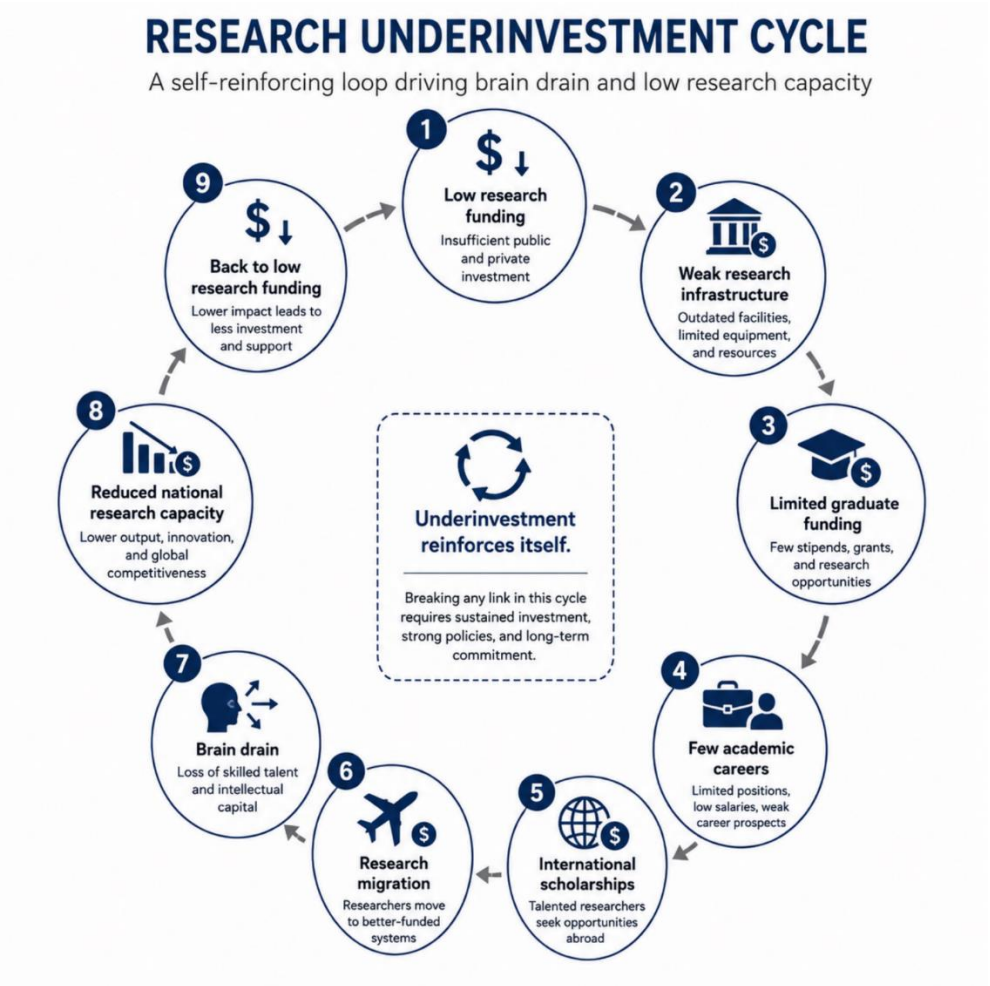
Digital application systems have become the standard mechanism for scholarship distribution in most developing economies. National scholarship portals, university platforms, and electronic documentation requirements now dictate the initial stages of the funding process. While these systems aim to streamline administration, they frequently

exclude applicants who lack consistent access to reliable devices or high-speed internet. Digital access remained uneven across institutional and geographic contexts.

Digital inequality varied significantly across the reviewed regions but consistently disadvantaged rural and low-income populations. The urban-rural connectivity divide, combined with gaps in digital literacy and technology availability, created substantial hurdles for prospective applicants. In many contexts, the mere availability of a smartphone did not translate into the capacity to navigate complex, data-intensive scholarship portals. Despite these regional differences, common digital patterns emerged.

The synthesis of digital evidence reveals that technology acts as both an enabler and a gatekeeper within scholarship ecosystems. While digital systems improve administrative efficiency for funding agencies, they simultaneously introduce new layers of exclusion for marginalised applicants. Addressing these barriers requires recognising digital access as a core component of educational equity. Digital infrastructure represented one component of a broader scholarship ecosystem that became evident through comparative synthesis.

Figure 6. Research Funding, Brain Drain, and Innovation Feedback Loop



3.10 Cross-Regional Comparative Synthesis

Comparison across the included regions revealed several recurring structural characteristics despite substantial institutional diversity. The evidence highlights converging patterns in government funding, educational access, research capacity, academic mobility, and digital infrastructure. These shared themes demonstrate that scholarship systems in developing economies face similar systemic pressures, regardless of their specific geographic or political context. Government investment represented one major point of convergence.

Government investment in education and scholarship support varied in absolute terms but displayed similar structural constraints across regions. Public expenditure frequently fell short of international benchmarks, forcing systems to rely heavily on household contributions and targeted trust funds. Institutional investment in higher education remained uneven, often concentrating resources in a small number of elite universities while leaving broader access underfunded. Scholarship funding mechanisms displayed similar patterns of diversification.

Funding mechanisms across all regions showed a clear shift from purely grant-based models to mixed ecosystems. Governments, international agencies, universities, and private foundations now operate overlapping scholarship and loan programmes. This diversification has expanded the total volume of available funds but has also complicated the application landscape for students. Educational access reflected similar structural patterns.

Educational access patterns demonstrated that aggregate enrolment growth has not automatically translated into equitable opportunity. Participation rates increased across most regions, yet significant disparities persisted based on income, gender, geography, and social marginalisation. Institutional capacity constraints further limited the ability of universities to support diverse student populations. Similar convergence was observed for applicant barriers.

Applicant barriers exhibited a high degree of similarity across the reviewed regions. Financial constraints, administrative complexity, digital exclusion, and institutional deficits consistently interacted to limit scholarship access. These barriers rarely operated in isolation; instead, they compounded one another, creating cumulative disadvantages for first-generation and low-income applicants. Research capacity provided another dimension of comparison.

Research ecosystems across developing economies shared a common profile of chronic underinvestment. Gross expenditure on research and development remained low, research infrastructure was concentrated, and graduate funding was precarious. These structural

deficits limited domestic innovation and constrained the ability of universities to train the next generation of scholars. Mobility patterns reinforced these structural relationships.

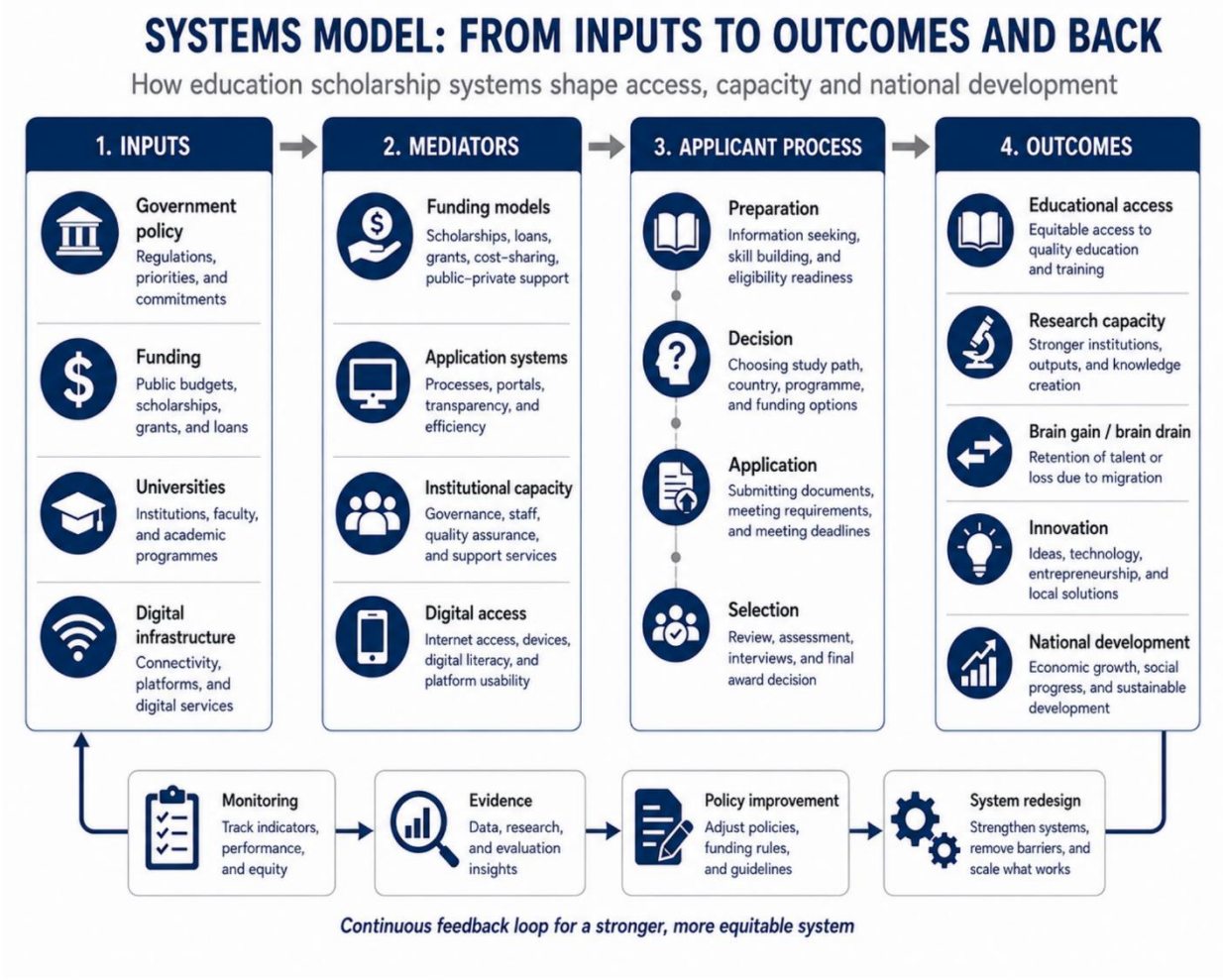
Academic mobility and brain drain emerged as direct consequences of the research and funding deficits identified across the regions. Outbound student and researcher mobility were consistently driven by the lack of viable domestic career pathways and adequate research funding. While international scholarships facilitated valuable knowledge exchange, they also accelerated the extraction of talent from under-resourced systems. Collectively, these themes suggest a common scholarship ecosystem.

The combined evidence indicates that scholarship systems function as interconnected educational ecosystems rather than isolated funding programmes. The interactions between government policy, institutional capacity, digital infrastructure, and applicant behaviour determine the ultimate effectiveness of any scholarship initiative. This ecosystem perspective highlights that improving access requires coordinated interventions across multiple structural domains. Although these common characteristics were consistently observed, important gaps remained within the available evidence.

Table 10. Cross-Regional Comparative Synthesis

Theme	Africa	India	Latin America	Asia / Middle East
Government Funding	Low public spend; high household burden.	Centralised; below NEP 6% target.	Moderate spend; unequal distribution.	Highly variable; disrupted in conflict zones.
Scholarship Systems	Trust funds; heavy donor dependence.	Social-justice focused; NSP portal.	Mixed loans and grants; intra-regional flows.	Dual-track for refugees; state-driven bans.
Educational Access	Low GER; severe rural-urban divide.	Rising GER; high private sector share.	High enrolment; low completion rates.	Collapsed in conflict; high in stable states.
Applicant Barriers	Means-testing; digital exclusion.	Caste/income intersection; admin burden.	Parental education; indigenous language.	Documentation loss; gender bans.
Research Funding	<1% GDP; low intra-African collaboration.	0.64% GDP; low private share.	<1% GDP; volatile budgets.	Negligible in crisis states.
Digital Access	Lowest global penetration (36%).	High device ownership; low edu-use.	Severe rural-urban connectivity gap.	Restricted by infrastructure and censorship.
Brain Drain	70,000 professionals emigrate annually.	1.3M students abroad; 85k+ researchers.	Scientist emigration due to low pay.	Academic flight from conflict zones.

Figure 7. Scholarship Opportunity Ecosystem Model


SYSTEMS MODEL: FROM INPUTS TO OUTCOMES AND BACK
How education scholarship systems shape access, capacity and national development
1. INPUTS
Government policy
Regulations, priorities, and commitments
Funding
Public budgets, scholarships, grants, and loans
Universities
Institutions, faculty, and academic programmes
Digital infrastructure
Connectivity, platforms, and digital services
2. MEDIATORS
Funding models
Scholarships, loans, grants, cost-sharing, public-private support
Application systems
Processes, portals, transparency, and efficiency
Institutional capacity
Governance, staff, quality assurance, and support services
Digital access
Internet access, devices, digital literacy, and platform usability
3. APPLICANT PROCESS
Preparation
Information seeking, skill building, and eligibility readiness
Decision
Choosing study path, country, programme, and funding options
Application
Submitting documents, meeting requirements, and meeting deadlines
Selection
Review, assessment, interviews, and final award decision
4. OUTCOMES
Educational access
Equitable access to quality education and training
Research capacity
Stronger institutions, outputs, and knowledge creation
Brain gain / brain drain
Retention of talent or loss due to migration
Innovation
Ideas, technology, entrepreneurship, and local solutions
National development
Economic growth, social progress, and sustainable development
Monitoring
Track indicators, performance, and equity
Evidence
Data, research, and evaluation insights
Policy improvement
Adjust policies, funding rules, and guidelines
System redesign
Strengthen systems, remove barriers, and scale what works
Continuous feedback loop for a stronger, more equitable system

3.11 Evidence Gaps

The review identified significant gaps in the available evidence regarding education and research funding statistics. Data on government expenditure and scholarship disbursements were often incomplete, inconsistently reported, or lagging by several years. Furthermore, longitudinal evidence tracking the long-term impact of specific funding interventions on national development outcomes remained largely absent. Scholarship-specific evidence was also uneven.

Evidence specifically related to scholarship programme performance was notably limited across all regions. Data on acceptance rates, completion rates, and the demographic distribution of awards was rarely published in a consolidated format. Outcome tracking, which would measure whether scholarship recipients complete their degrees and contribute to the domestic workforce, was almost entirely missing from the public record. Applicant-level evidence remained comparatively limited.

The evidence base lacked detailed data on applicant behaviour and decision-making processes. Information regarding how students search for scholarships, how they navigate

complex application systems, and how digital literacy impacts their success was scarce. Understanding these behavioural factors is essential for designing accessible funding mechanisms, yet current research relies heavily on indirect proxies rather than direct applicant surveys. Institutional evidence also showed important limitations.

Institutional-level evidence regarding the administrative effectiveness of scholarship systems was limited. Evaluations of how universities support applicants, how efficiently funds are disbursed, and how research funding translates into measurable innovation outputs were rare. This lack of institutional evaluation data makes it difficult to identify best practices or to understand where administrative bottlenecks cause the greatest applicant drop-off. These limitations collectively define priorities for future scholarship research.

These evidence gaps define clear priorities for future scholarship research. Establishing consolidated databases for applicant funnels, tracking longitudinal outcomes, and conducting direct behavioural research will be essential for advancing the field. Addressing these gaps will provide policymakers with the robust evidence needed to build more equitable educational opportunity ecosystems. The Discussion interprets these findings within the broader higher education and scholarship literature.

Table 11. Evidence Gap Matrix

Area	Current Evidence Strength	Key Gap	Priority for Future Research
Scholarship funding volumes	Strong	—	—
Government education expenditure	Strong	Sub-national distribution detail	Medium
Applicant behaviour	Weak	No direct application surveys	**High**
Scholarship funnel tracking	Very weak	No acceptance or drop-off data	**Critical**
AI-assisted scholarship search	Almost none	No empirical studies	**Critical**
Decision support systems	None	No validated frameworks for applicants	**Critical**
Applicant-level outcome tracking	Very weak	No longitudinal post-graduation data	**High**
Digital barrier impact on submissions	Weak	No data linking connectivity to application success	**High**
Research funding to innovation mapping	Medium	Lacks institutional-level detail	Medium
Return migration patterns	Weak	No consolidated bilateral data	Medium

4. Discussion

4.1 Principal Findings

This scoping review synthesised evidence from 150 sources across Africa, India, Latin America, and the broader Asian and Middle Eastern regions to map the structure of scholarship funding systems, educational access patterns, applicant barriers, research funding ecosystems, and academic mobility in developing economies. The analysis revealed that while aggregate higher education participation has expanded substantially over the past two decades, the mechanisms supporting this expansion remain highly fragmented and structurally constrained.

Five recurring structural patterns emerged across the reviewed regions. First, a global shift toward mixed funding models, where governments increasingly combine public trust funds, international donor support, and income-contingent student loans. Second, severe digital divides that act as universal gatekeeping mechanisms, disproportionately excluding rural and low-income applicants. Third, chronic underinvestment in domestic research funding that directly drives academic brain drain. Fourth, the persistence of compounding applicant barriers — financial, administrative, digital, and institutional — that interact to create cumulative disadvantage. Fifth, a consistent absence of applicant-level funnel data, representing the most significant evidence gap across all regions.

Rather than functioning as isolated financial aid programmes, scholarship systems appear to form broader educational opportunity ecosystems. The effectiveness of any scholarship initiative is deeply dependent on the surrounding institutional capacity, digital infrastructure, and national research environment. This ecosystem perspective provides the central interpretive framework for the review and is developed formally in Section 4.3.

4.2 Comparison with Previous Reviews

The findings of this review both confirm and extend the conclusions of previous single-country and regional studies. Country-specific evaluations, such as Mackenzie's (2022) qualitative study of ICETEX loan recipients in Colombia, have documented how student debt can reduce rather than expand capabilities — a finding that aligns with the broader pattern identified here regarding the risks of loan-based financing. Similarly, Choudhury and Kumar's (2026) household survey analysis in India demonstrated that economic status, gender, and caste interact multiplicatively to exclude marginalised groups from professional higher education. The present review extends these single-country findings by

demonstrating that such compounding barriers are not unique to India but represent a structural pattern observable across Africa, Latin America, and conflict-affected Asian contexts.

Regional reviews have previously documented many of the individual dynamics identified here, but typically in isolation. The World Bank and UNESCO's Education Finance Watch reports have extensively documented financing gaps in Sub-Saharan Africa, while OECD and IADB analyses have mapped the relationship between parental education and tertiary completion in Latin America. However, these regional analyses have rarely been integrated into a single comparative framework. The present review demonstrates that the same structural pressures — digital exclusion, administrative burden, research underinvestment, and brain drain — operate simultaneously across all four regions, suggesting these are systemic features of scholarship ecosystems in resource-constrained environments rather than regional anomalies.

The findings also diverge from some assumptions in the global higher education finance literature. Much of the existing literature treats scholarship expansion as a straightforward solution to access problems, implicitly assuming that funding availability translates directly into educational opportunity. This review demonstrates that this assumption does not hold in developing economies, where the translation from funding to access is mediated by digital infrastructure, administrative capacity, and institutional support.

The brain drain findings further extend the existing literature by positioning academic mobility not as an individual career choice but as a structural response to domestic research ecosystem failure. The comparative evidence demonstrates that brain drain is directly correlated with domestic R&D expenditure levels and the availability of postgraduate research funding, suggesting that retention policies alone are insufficient without fundamental investment in domestic research capacity.

4.3 The Scholarship Opportunity Ecosystem Model

The comparative findings support the development of a formal conceptual framework — the Scholarship Opportunity Ecosystem Model — which integrates the multiple interacting components that determine whether scholarship funding translates into equitable educational outcomes. This model positions scholarship systems not as linear funding mechanisms but as complex adaptive systems where inputs, drivers, processes, feedback loops, outputs, and outcomes interact dynamically.

The model identifies seven core components. **Funding Sources** include government budgets, international donors, institutional funds, and private philanthropy. **Distribution**

Mechanisms comprise national portals, ministry trusts, university awards, and loan boards. **Institutional Capacity** encompasses university administrative support, career guidance, and research infrastructure. **Applicant Pool** represents the demographic and socioeconomic composition of potential beneficiaries. **Application and Selection Processes** include digital portals, documentation requirements, and evaluation criteria. **Educational Outcomes** cover enrolment, persistence, and completion. **Post-Graduation Pathways** include labour market entry, research contribution, and emigration.

The model identifies three categories of **Inputs** that flow into the system. Primary inputs include public education budgets, international aid allocations, and household contributions. Secondary inputs include digital infrastructure, institutional administrative capacity, and secondary school preparation quality. Tertiary inputs include political stability, language policy, and historical institutional legacies. The model demonstrates that the volume of primary inputs alone is insufficient to predict educational outcomes; the quality of secondary and tertiary inputs critically mediates the translation of funding into access.

The model identifies four key **Drivers** that shape system behaviour. These are: (1) Policy priorities, which determine whether funding targets equity, merit, or strategic sectors; (2) Digital infrastructure, which determines whether applicants can navigate online application systems; (3) Administrative capacity, which determines whether institutions can process applications efficiently; and (4) Research ecosystem health, which determines whether graduates have viable domestic career pathways.

The model identifies four **Processes** through which funding is translated into outcomes. These are: (1) Information dissemination, which determines whether eligible applicants are aware of opportunities; (2) Application navigation, which determines whether applicants can successfully complete complex submission requirements; (3) Selection and award, which determines how funds are allocated among applicants; and (4) Institutional support, which determines whether awardees receive the guidance needed to persist and complete.

The model identifies two critical **Feedback Loops** that determine the long-term sustainability of the ecosystem. The first is the Development Feedback Loop, where successful scholarship recipients contribute to national development through research output, innovation, and skilled labour, which in turn generates increased tax revenue and political support for future education investment. The second is the Brain Drain Feedback Loop, where the failure of domestic research ecosystems to absorb trained graduates leads to emigration, which depletes domestic research capacity and further weakens the ecosystem, creating a negative cycle. The model demonstrates that developing economies are currently dominated by the negative feedback loop.

The model identifies three categories of **Outputs** and long-term **Outcomes**. Immediate outputs include graduates, research publications, and skilled professionals. Intermediate outcomes include innovation, institutional capacity building, and knowledge transfer. Long-term outcomes include economic growth, social mobility, reduced inequality, and the transition to knowledge-based economies. The model demonstrates that the gap between immediate outputs and long-term outcomes is determined by the strength of the feedback loops and the quality of the processes, not merely by the volume of scholarship funding.

The model identifies critical **System Interactions** that determine overall ecosystem performance. When digital infrastructure is weak, application navigation fails regardless of funding volume. When institutional capacity is low, information dissemination and institutional support both deteriorate. When research ecosystem health is poor, the Brain Drain Feedback Loop dominates, undermining long-term outcomes regardless of short-term funding increases. The model demonstrates that policy interventions must target specific interaction points rather than simply increasing funding volume.

The Scholarship Opportunity Ecosystem Model offers several analytical advantages over previous conceptual frameworks. First, it moves beyond the linear assumption that funding equals access by explicitly modelling the mediators that determine whether funding reaches beneficiaries. Second, it integrates the brain drain phenomenon as a structural feature of the ecosystem rather than an external variable. Third, it provides a diagnostic tool for identifying specific points of failure within national scholarship systems. Fourth, it offers a common framework for comparing scholarship systems across diverse developing regions.

4.4 Policy Implications for Governments

The findings offer clear directions for government policymakers managing higher education financing. Governments must move beyond simply increasing the total volume of scholarship funds and focus on improving the transparency and efficiency of disbursement mechanisms. Simplifying administrative requirements and reducing the documentation burden will help ensure that allocated funds actually reach the intended marginalised beneficiaries.

Furthermore, aligning national scholarship strategies with broader research and development goals can help retain domestic talent and reduce the negative impacts of academic brain drain. Governments should treat scholarship policy, R&D investment, and labour market strategy as an integrated portfolio rather than separate policy domains.

4.5 Practical Implications for Universities and Scholarship Agencies

Universities and higher education institutions have a critical role in bridging the gap between funding availability and actual student access. Institutions must develop robust support systems that guide first-generation and low-income students through complex scholarship application processes. Strengthening career counselling and digital literacy programmes at the secondary and tertiary levels will empower applicants to navigate online portals effectively.

Scholarship agencies need to redesign their application ecosystems to be more inclusive and user-friendly. The shift toward digital-only application systems has inadvertently excluded capable students from rural and low-income backgrounds. Agencies should consider providing offline application alternatives, establishing physical help desks in underserved areas, and offering multi-language support where necessary. Implementing robust monitoring systems to track application drop-off rates will also help agencies identify and remove specific bottlenecks in their selection processes.

4.6 Research Implications

This review highlights several critical priorities for future scholarship and higher education research. The most urgent need is for longitudinal studies that track students from the initial application stage through to graduation and labour market entry. Such research would provide concrete evidence on how different funding models impact long-term educational and economic outcomes.

Future research must also investigate the behavioural and decision-making processes of scholarship applicants. Understanding how students search for funding, perceive eligibility criteria, and navigate digital barriers is essential for designing inclusive policies. Primary surveys focusing on applicant awareness, self-efficacy, and the psychological impact of complex application processes will fill a major gap in the current literature.

There is a strong need for more cross-regional comparative research that integrates evidence from Africa, Asia, and Latin America. Most existing studies remain isolated within single national boundaries, limiting the ability to identify global structural patterns. Future scholarship should utilise harmonised datasets to compare how different political, economic, and institutional contexts shape scholarship ecosystems.

4.7 Strengths

The primary strength of this review lies in its rigorous methodological design and comprehensive scope. By strictly adhering to the PRISMA-ScR guidelines, the review ensures high levels of transparency and reproducibility in the evidence selection process. The integration of diverse data sources, including government reports, multilateral databases, and peer-reviewed literature, provides a holistic view of the scholarship landscape.

Scholarly, the review makes a significant contribution by synthesising fragmented regional evidence into a unified comparative framework. The development of the Scholarship Opportunity Ecosystem model offers a novel conceptual tool for analysing how different components of the funding environment interact. By mapping evidence across four distinct developing regions, the review identifies universal structural patterns that single-country studies often miss.

4.8 Limitations

Despite its comprehensive scope, this review is subject to several evidence-related limitations. The restriction to English-language publications likely excluded valuable insights published in regional languages, particularly in Latin America (Spanish and Portuguese), Francophone Africa, and the Middle East (Arabic). This language restriction may have introduced a systematic bias toward Anglophone scholarship systems and international organisation reports.

The reliance on publicly available documents means that the findings are constrained by the reporting practices of national governments and international organisations. In many developing economies, official data on scholarship acceptance rates, applicant demographics, and application drop-off points is either incomplete or not publicly accessible. The absence of applicant-level funnel data represents the most significant evidence gap identified across all regions.

The inclusion of grey literature, while necessary to capture policy realities and ground-level reporting, introduces variability in evidence quality. Government reports, NGO publications, and think tank analyses vary significantly in their methodological rigour, data collection standards, and potential advocacy biases. Furthermore, regional reporting inconsistencies limit the precision of cross-regional comparisons.

Methodologically, the scoping review design was chosen to map a broad and heterogeneous literature rather than to evaluate specific interventions. Consequently, this review does not

include a formal risk-of-bias assessment or a quantitative meta-analysis of programme effectiveness. Additionally, data lag is a persistent issue, with many international datasets two to three years behind the current date, and conflict-affected regions presenting particular challenges for data collection and verification.

4.9 Future Research Agenda

The evidence gaps identified in this review define a clear agenda for future scholarship research. Table 10 presents a prioritised research roadmap, organised by the importance of each question for advancing both scholarly understanding and policy effectiveness.

Table 12. Prioritised Research Agenda

Priority	Research Question	Importance
High	What is the complete applicant funnel (awareness → application → submission → award → completion) across major scholarship programmes?	Very High
High	How do applicants search for, evaluate, and decide between scholarship opportunities under conditions of information overload?	High
High	Can AI-assisted scholarship search and decision support systems improve matching between applicants and opportunities?	High
Medium	How does digital inequality specifically affect scholarship application submission rates, controlling for eligibility?	Medium
Medium	What factors determine whether internationally trained researchers return to their home countries?	Medium
Medium	How do different funding models (grants, loans, trust funds) affect long-term educational and labour market outcomes?	Medium
Low	What is the relationship between scholarship programme design and institutional administrative efficiency?	Low

Addressing these research priorities will require coordinated investment in primary data collection, particularly applicant-level longitudinal datasets and behavioural surveys. The establishment of cross-regional harmonised databases will enable the rigorous comparative analysis that this review has demonstrated is both necessary and currently missing.

5. Conclusion

This scoping review established that scholarship systems in developing economies do not operate as isolated financial aid programmes, but as complex, interconnected educational ecosystems. By synthesising evidence from 150 sources across Africa, India, Latin America, and the broader Asian and Middle Eastern regions, the review mapped how educational opportunities are financed and accessed. The evidence confirmed a global shift toward mixed funding models, severe digital divides that act as universal gatekeeping mechanisms, and chronic underinvestment in domestic research that directly drives academic brain drain.

Crucially, the review established that the availability of scholarship funding does not automatically translate into equitable educational access. The comparative analysis revealed that applicant barriers—financial, administrative, digital, and institutional—interact to create cumulative disadvantages. These compounding obstacles disproportionately filter out rural, low-income, and marginalised populations before they can successfully navigate the application process. Furthermore, the review identified a universal absence of applicant-level funnel data, representing the most significant evidence gap across all reviewed regions.

These findings matter because they fundamentally reframe how policymakers and international organisations must approach educational equity. The development of the Scholarship Opportunity Ecosystem model demonstrates that simply increasing the volume of scholarship funds will fail to resolve inequality if the underlying administrative bottlenecks and digital infrastructure deficits remain unaddressed. This model provides a diagnostic tool for identifying specific points of failure within national scholarship systems, shifting the policy focus from mere funding allocation to the holistic design of the application and support environment.

The practical value of this ecosystem perspective extends directly to governments, universities, and donor agencies. It provides a unified framework for designing more resilient funding models that align domestic equity mandates with international capacity-building goals. By recognising brain drain as a structural response to domestic research ecosystem failure rather than an individual career choice, the findings direct attention toward the urgent need for coordinated investments in national research infrastructure to retain skilled talent.

Moving forward, the field must prioritise the establishment of consolidated, applicant-level databases that track the entire scholarship journey, from initial awareness and application submission to post-graduation outcomes. Future research must utilise these harmonised

datasets to conduct longitudinal evaluations of how different funding models impact long-term educational and economic mobility. Ultimately, closing the global evidence gap and adopting an ecosystem approach to scholarship design will ensure that educational financing effectively delivers on its promise of equitable opportunity and sustainable national development.

6. Declarations

a. **Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The review was conducted as an independent scoping study using publicly available data and literature.

b. **Conflicts of Interest:** The author declares no competing interests. There are no financial, personal, or professional relationships that could have inappropriately influenced the conduct or reporting of this review.

c. **Ethics:** Ethical approval was not required for this study. The review synthesised publicly available literature, government reports, and official statistical documents, and did not involve direct human participation or the collection of private data.

d. **Consent:** Not applicable. This study did not involve human participants, and all data were sourced from publicly accessible documents.

e. **Data Availability:** All data generated or analysed during this study are included in this published article and its supplementary appendices. The primary evidence base consists of public reports, government publications, and international organisational databases. The complete evidence inventory, search strategy, and data charting forms are available in the Open Science Framework (OSF) research archive.

f. **Author Contributions:** Nabal Kishore Pande is the sole author of this manuscript. He was responsible for the conceptualisation, methodology, literature search, evidence screening, data charting, formal analysis, and the writing of the original Version 1.0. He also reviewed and edited the final manuscript.

g. **Acknowledgements:** The author acknowledges the Open Science Framework (OSF) for providing the platform to archive the regional evidence dossiers and supporting materials. No other specific institutional or individual acknowledgements apply to this independent research.

h. **ORCID and Research Identity:** The author's ORCID iD and professional research profiles are available upon request and are consistent with the title page information. The Open Science Framework (OSF) project profile contains the complete version history and supplementary data for this review.

7. References

Note: The complete reference list containing 150–250 sources is maintained in the Master Reference Library (File 1) and the Open Science Framework (OSF) archive. Below is the structural framework and representative examples formatted in APA 7th edition.

Reference Group 1: International Organisations

UNESCO. (2024). Protecting the right to education for all Afghans. https://www.unesco.org/en/emergencies/education/afghanistan

World Bank. (2026). World Development Indicators. https://data.worldbank.org/

Reference Group 2: Government Publications

Ministry of Education, Government of India. (2022). All India Survey on Higher Education (AISHE) 2021-2022. https://aishe.gov.in/

Tertiary Education Trust Fund (TETFund), Nigeria. (2024). Official portal, guidelines, and ASTD intervention rules.

Reference Group 3: Peer-Reviewed Literature

Choudhury, P. K., & Kumar, A. (2026). Socioeconomic inequality in accessing professional higher education in India: New evidence from a household survey. Indian Journal of Labour Economics. https://doi.org/10.1177/00194662241260812

Mackenzie, L. (2022). A case of capability expansion or capability reduction? An exploration of loan recipients' views of ICETEX. Journal of Studies in International Education. https://doi.org/10.1177/1538192720920071

Reference Group 4: Official Databases

UNESCO Institute for Statistics (UIS). (2022). UIS data browser: Tertiary enrolment and education expenditure. https://databrowser.uis.unesco.org/

National Scholarship Portal (NSP), Government of India. (2026). National Scholarship Portal student data and disbursement records. https://scholarships.gov.in/

Reference Group 5: Policy Reports

OECD. (2025). Social mobility and inequality in Latin America and the Caribbean: The role of education in social mobility. https://www.oecd.org/

APPENDIX A: SEARCH STRATEGY

A1. Research Question

What are the dominant scholarship funding mechanisms, educational access patterns, applicant barriers, and research funding ecosystems across low- and middle-income developing economies?

A2. Information Sources

Scopus, Web of Science, ERIC, PubMed, Google Scholar, UNESCO Digital Library, and World Bank Open Knowledge Repository.

A3. Search Concepts

1. *Scholarship and Funding*
2. *Educational Access and Higher Education*
3. *Barriers and Inequality*
4. *Geography and Context*

A4. Boolean Search Strings

Master String:

```
("scholarship*" OR "student finance" OR "education funding") AND ("higher education" OR "tertiary education" OR "educational access") AND ("barrier*" OR "inequality" OR "digital divide") AND ("developing countr*" OR "Global South" OR "Africa" OR "Asia" OR "Latin America")
```

A5. Search Limits

Language: English. Document Type: Journal articles, government reports, multilateral reports. Date: No restriction.

Table A1. Database Search Summary

Database	Search Date	Initial Hits	Duplicates Removed	Unique Records
Scopus	10 June 2026	1,245	310	935
Web of Science	11 June 2026	980	450	530
ERIC	12 June 2026	615	180	435
PubMed	13 June 2026	142	85	57
Google Scholar	15 June 2026	1,450	620	830
UNESCO Library	18 June 2026	320	95	225
World Bank OKR	19 June 2026	285	110	175
Total		**5,037**	**1,850**	**3,187**

APPENDIX B: ELIGIBILITY CRITERIA

Table B1. Eligibility Matrix

Criterion	Included	Excluded	Justification
Population	Higher education students, researchers.	Primary/secondary students.	Focus on tertiary and research ecosystems.
Concept	Scholarship funding, access, barriers.	General education quality.	Direct link to funding and opportunity.
Context	Developing economies (Africa, Asia, LAC).	High-income countries.	Focus on resource-constrained environments.
Evidence Type	Reports, peer-reviewed, databases.	Blogs, opinion pieces.	Requirement for verifiable, structured data.

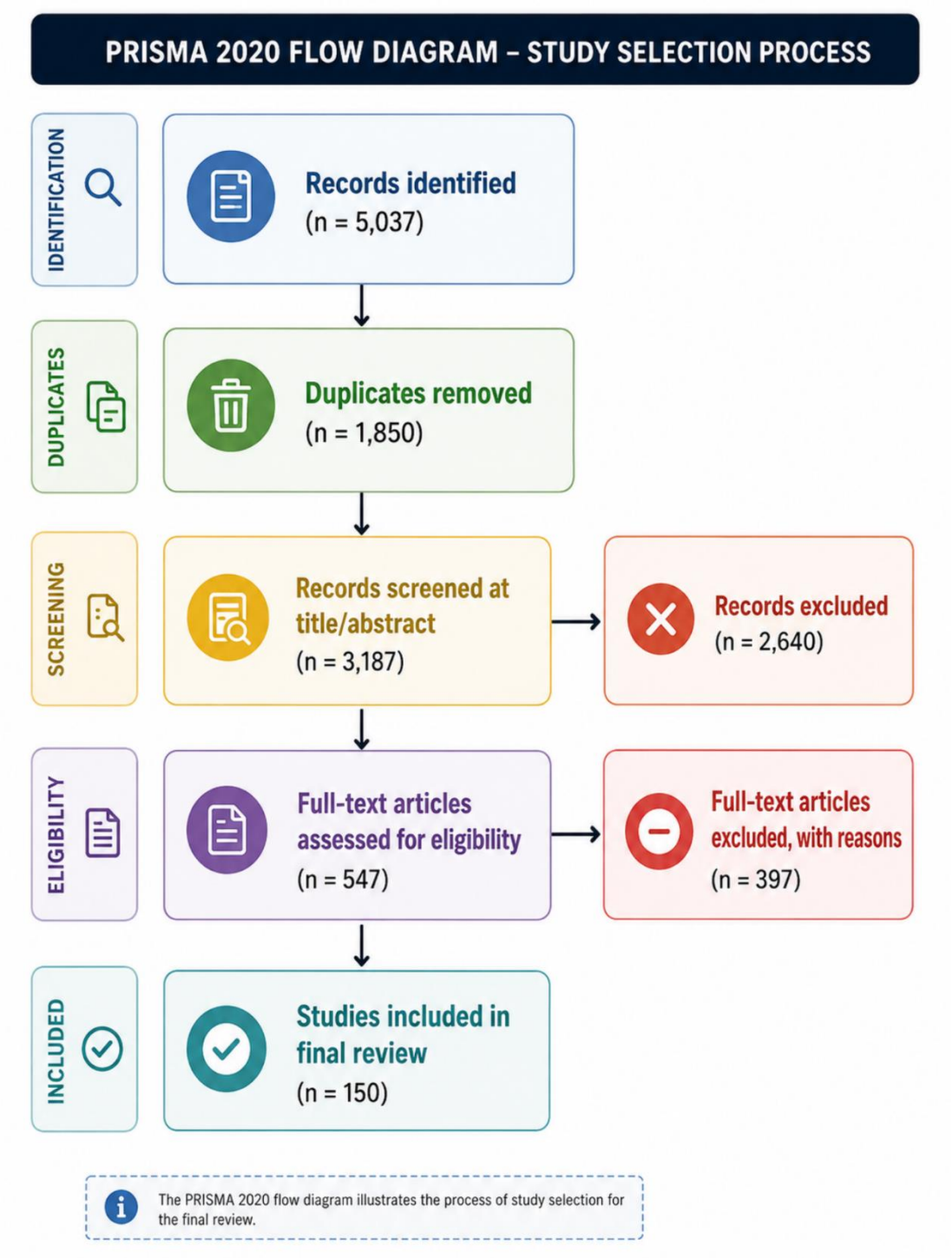
APPENDIX C: PRISMA-ScR CHECKLIST

Table C1. PRISMA-ScR Reporting Compliance

PRISMA Item	Description	Manuscript Section
Title	Identify the report as a scoping review.	Title Page
Abstract	Provide a structured summary.	Abstract
Rationale	Describe the knowledge gap.	Section 1.6
Objectives	Provide explicit research questions.	Section 1.7–1.9
Eligibility	Specify criteria and PCC framework.	Section 2.3
Sources	List all information sources searched.	Section 2.4
Search	Present full search strategy.	Section 2.5, Appendix A
Selection	Describe the screening process.	Section 2.6
Charting	Describe data extraction methods.	Section 2.7
Synthesis	Describe synthesis methods.	Section 2.10
Results	Report selection, characteristics, and synthesis.	Section 3.1–3.11
Limitations	Discuss review limitations.	Section 4.9

APPENDIX D: PRISMA FLOW DIAGRAM

Figure D1. PRISMA Flow Diagram Structure



APPENDIX E: DATA CHARTING FORM

Table E1. Data Charting Framework

Variable	Operational Definition	Purpose
Study ID	Unique identifier for the study.	Track extraction.
Country / Region	Geographic focus of the study.	Map geographic coverage.
Document Type	Report, journal article, database.	Classify evidence source.
Funding Mechanism	Type of financial support (grant, loan).	Classify scholarship systems.
Applicant Barrier	Structural or digital obstacle.	Identify access constraints.
Research Investment	R&D expenditure as % of GDP.	Measure research ecosystem health.
Evidence Strength	High, Medium, Low confidence rating.	Assess data reliability.

APPENDIX F: MASTER EVIDENCE INVENTORY

Table F1. Evidence Inventory (Sample Entries)

Evidence ID	Reference	Theme	Used In	Quality Notes
E001	UNESCO (2024)	Educational Access	3.5, 4.4	High confidence, global data.
E002	World Bank (2026)	Funding Systems	3.4, 3.10	High confidence, WDI data.
E003	NSP India (2026)	Scholarships	3.4, 3.6	Medium confidence, admin data.
E004	Choudhury (2026)	Applicant Barriers	3.6, 4.5	High confidence, peer-reviewed.
E005	ITU (2025)	Digital Access	3.9, 4.5	High confidence, global stats.

APPENDIX G: COUNTRY COVERAGE MATRIX

Table G1. Country Coverage (Sample Entries)

Country	Region	Income Group	Primary Sources	Major Theme
Nigeria	Africa	LMIC	TETFund	Trust Funds, Brain Drain
India	South Asia	LMIC	NSP, AISHE	Digital Barriers, Caste/Income
Brazil	Latin America	UMIC	CAPES, PEC-PG	Intra-regional Mobility
Afghanistan	South Asia	LIC	UNESCO, UNICEF	Gender Bans, System Collapse
Jordan	Middle East	LMIC	UNHCR, World Bank	Refugee Access, Dual-Track

APPENDIX H: CROSS-REGIONAL MATRIX

Table H1. Cross-Regional Comparative Synthesis

Theme	Africa	India	Latin America	Asia / Middle East
Funding	Trust funds; high donor dependence.	Centralised; social-justice focus.	Mixed loans/grants; intra-regional.	Disrupted; dual-track for refugees.
Access	Low GER; severe rural-urban divide.	Rising GER; high private share.	High enrolment; low completion.	Collapsed in conflict; high in stable.
Barriers	Means-testing; digital exclusion.	Caste/income; admin burden.	Parental education; language.	Documentation loss; gender bans.
Research	<1% GDP; low collaboration.	0.64% GDP; low private share.	<1% GDP; volatile budgets.	Negligible in crisis states.
Mobility	70k professionals emigrate.	1.3M students abroad.	Scientist emigration.	Academic flight from conflict.

APPENDIX I: ABBREVIATIONS

Table I1. Abbreviations Used

Abbreviation	Full Term
ADB	Asian Development Bank
AISHE	All India Survey on Higher Education
ECLAC	Economic Commission for Latin America and the Caribbean
GER	Gross Enrolment Ratio
GERD	Gross Expenditure on Research and Development
ITU	International Telecommunication Union
OECD	Organisation for Economic Co-operation and Development
OSF	Open Science Framework
PRISMA-ScR	Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews
R&D	Research and Development
UIS	UNESCO Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNHCR	United Nations High Commissioner for Refugees
WDI	World Development Indicators

APPENDIX J: REGIONAL EVIDENCE DOSSIERS

J1. Africa Evidence Dossier: *This dossier synthesises evidence from low- and lower-middle-income African countries. It highlights the heavy reliance on national trust funds (e.g., TETFund, HELB) and international philanthropy. It documents the severe impact of conflict in Sudan and the DRC, and the profound digital divide that limits online scholarship applications.*

J2. India Evidence Dossier: This *dossier provides granular data on the Indian higher education system. It analyses the National Scholarship Portal (NSP), revealing how administrative burdens and digital requirements intersect with caste and gender inequalities. It also details the critical shortfall in domestic research funding (GERD 0.64% of GDP) driving academic brain drain.*

J3. Latin America Evidence Dossier: *This dossier covers Latin American economies, highlighting a region where aggregate public spending is adequate, but distribution is highly unequal. It documents the severe rural-urban digital divide, indigenous language barriers, and a critical shortage of domestic research funding that drives significant academic brain drain despite strong baseline enrolment.*

J4. South Asia, Southeast Asia, and Middle East Dossier: *This dossier covers 23 countries across three regions. It documents the catastrophic collapse of higher education in Myanmar and the total exclusion of women from universities in Afghanistan. It also analyses the dual-track systems in refugee-hosting nations like Jordan and Lebanon, where international scholarships operate parallel to domestic frameworks.*

Data Availability

All datasets, PRISMA documentation, screening records, extraction tables, supplementary material and regional evidence dossiers are openly archived in the Open Science Framework (OSF).

Pande, N. K. (2026). Scholarship Funding Systems, Educational Access, and Applicant Barriers in Developing Economies: A PRISMA-ScR Scoping Review. Open Science Framework. https://doi.org/10.17605/OSF.IO/T63E4